Body Builders Layout Book

MEDIUM DUTY F-650/750

WHAT'S NEW

- Added Electrical Interface Content

Body Builders Layout Book

MEDIUM DUTY F-650/750

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INTRODUCTION

IMPORTANT NOTICES

The information described herein is believed to be correct at the time of publication, but accuracy cannot be guaranteed. Ford reserves the right to discontinue models or change specifications or designs at any time without notice and without incurring any obligation.

Representations regarding the compliance of any Ford- manufactured incomplete vehicle to any rule, regulation or standard issued pursuant to the National Traffic and Motor Vehicle Safety Act or the Canadian Motor Vehicle Safety Act are set forth only in the Incomplete Vehicle Manual (IVM) which accompanies each incomplete vehicle.

Regulations such as those issued by the Federal Highway Administration (FHA) or issued pursuant to the Occupational Safety and Health Act (OSHA), and/or state, provincial, and local laws and regulations may require installation of additional equipment for the particular use intended for the vehicle. It is the responsibility of the subsequent stage manufacturer or completed vehicle alterer and the vehicle purchaser to ascertain how the vehicle will ultimately be used, if FHA, OSHA or state provincial or local regulations apply and how the vehicle as completed will comply with those requirements. Nothing contained herein is to be construed as a representation that such equipment required for the particular use intended has been installed on the completed or incomplete vehicle.

REFERENCE INFORMATION

Ford Body Builder Advisory Service Publications

This document is an example of a program-specific Body Builders Layout Book (BBLB) published by the Ford Body Builder Advisory Service (BBAS) team. Each Ford Commercial Truck vehicle line has a similar document that aims to provide detailed information which may be of interest to a subsequent-stage manufacturer or alterer.

The Ford Transit and Transit Connect also have a Body and Equipment Mounting Manual (BEMM), which is a comprehensive resource dedicated to body and equipment mounting information.

Yet another source of program-specific information are the “Vehicle Specification” documents available on the Ford BBAS website. Information typically found in these documents are vehicle curb and accessory weights, vehicle dimensions, component descriptions, capacities, GAWRs, alternator output, powertrain output and gear ratios.

In addition to the program-specific documents, there are several Ford BBLB documents that contain general best practices or information on specific subjects that span multiple vehicle lines. These include:

- General BBLB - contains Definitions, Design Recommendations and Vehicle Storage Guidelines.
- Snowplow BBLB
- Pickup Box Removal BBLB

These publications are updated every model year and can be accessed via the web at https://www.fordpro.com/en-us/upfit/bbas/com under “Publications”. For BBLB and BEMM documents, expand the “Body Builder Layout Book” Section to view all available documents. For Vehicle Specifications, expand the “Vehicle Specifications” section. The website search function can be used to filter for specific content or vehicle line.

Ford Body Builder Advisory Service Bulletins

Occasionally, the Ford BBAS team will create an SVE “Bulletin” to address a specific issue or distribute important information in a timely manner. These documents can be accessed via the web at https://fordbbas.com, under “Bulletins”. The website search function can be used to filter for specific content or vehicle line.

If applicable, information from each SVE bulletin will be incorporated into the appropriate BBLB document the following model year. In some cases, SVE bulletins will continue to be referenced in this document.

Ford Body Builder Advisory Service Contact

The Ford Truck Body Builder Advisory Service may be consulted if questions regarding the completion of Ford commercial vehicles are not adequately addressed in the documentation described above. For assistance call (877) 840-4338 or e-mail via the web at https://fordbbas.com under “Contact Us” and select “General Questions”.

For Ford vehicle CAD requests, please visit https://www.fordpro.com/en-us/upfit/cad/.

For both Questions and CAD Requests, please be as specific as possible with the request details to assure the most accurate and timely response.

Ford Service Publications

Ford Service Technical Resources (including wiring diagrams, repair manuals and diagnostic tool support) are available by subscription via the Motorcraft website: www.motorcraftservice.com

The following publications are examples of digital and printed manuals which are available from Helm Incorporated; call 1-800-782-4356 or contact Helm, Inc. at their website www.helminc.com:

- Ford Truck Shop Manuals
- Ford Towing Manuals
- Ford Wiring Diagrams

Body Builders Layout Book

MEDIUM DUTY F-650/750

MODEL LINEUP: REGULAR CAB (DIESEL)

REGULAR CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-650 STRAIGHT FRAME/HYDRAULIC	158	84	49	26,000	6,218	3,451	9,669	534 FRAME 12.64 SM / 50 KSI
	176	102	70	26,000	6,272	2,509	9,780	
	182	108	70	26,000	6,290	3,528	9,817	
	194	120	75	26,000	6,326	3,566	9,897	
	200	126	75	26,000	6,344	3,585	9,928	
	212	138	81	26,000	6,379	3,623	100,002	
	218	144	81	26,000	6,397	3,642	10,039	
	224	150	87	26,000	6,415	3,661	10,079	
	230	156	87	26,000	6,433	3,680	10,113	
	242	168	100	26,000	6,469	3,718	10,187	
	260	186	120	26,000	6,523	3,775	10,298	
	281	207	120	26,000	6,815	3,944	10,759	538 FRAME 16.98 SM / 120 KSI
F-650 STRAIGHT FRAME/AIR	158	84	49	26,000	6,466	3,631	10,097	534 FRAME 12.64 SM / 50 KSI
	176	102	70	26,000	6,519	3,688	10,207	
	182	108	70	26,000	6,537	3,707	10,244	
	194	120	75	26,000	6,573	3,745	10,318	
	200	126	75	26,000	6,591	3,764	10,355	
	212	138	81	26,000	6,627	3,803	10,430	
	218	144	81	26,000	6,645	3,822	10,467	
	224	150	87	26,000	6,663	3,841	10,504	
	230	156	87	26,000	6,681	3,860	10,541	
	242	168	100	26,000	6,717	3,898	10,615	
	260	186	120	26,000	6,771	3,955	10,726	
	281	207	120	26,000	7,062	4,124	11,186	538 FRAME 16.98 SM / 120 KSI

Body Builders Layout Book

MEDIUM DUTY F-650/750

MODEL LINEUP: REGULAR CAB (DIESEL)

REGULAR CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-750 STRAIGHT FRAME/HYDRAULIC	158	84	49	31,000	6,294	3,746	10,040	535 FRAME 15.14 SM / 80 KSI
	176	102	70	31,000	6,371	3,808	10,179	
	182	108	70	31,000	6,397	3,828	10,225	
	194	120	75	31,000	6,448	3,870	10,318	
	200	126	75	31,000	6,474	3,891	10,365	
	212	138	81	31,000	6,525	3,932	10,457	
	218	144	81	31,000	6,551	3,953	10,504	
	224	150	87	31,000	6,577	3,973	10,550	
	230	156	87	31,000	6,602	3,994	10,596	
	242	168	100	31,000	6,654	4,036	10,690	
	260	186	120	31,000	6,731	4,096	10,827	
	281	207	120	31,000	6,890	4,193	11,083	538 FRAME 16.98 SM / 120 KSI
F-750 STRAIGHT FRAME/AIR	158	84	49	31,000	6,556	3,847	10,413	535 FRAME 15.14 SM / 80 KSI
	176	102	70	31,000	6,643	3,910	10,552	
	182	108	70	31,000	6,668	3,930	10,598	
	194	120	75	31,000	6,720	3,972	10,691	
	200	126	75	31,000	6,745	3,992	10,738	
	212	138	81	31,000	6,797	4,034	10,830	
	218	144	81	31,000	6,823	4,055	10,877	
	224	150	87	31,000	6,848	4,075	10,923	
	230	156	87	31,000	6,874	4,096	10,970	
	242	168	100	31,000	6,925	4,137	11,062	
	260	186	120	31,000	7,003	4,198	11,201	
	281	207	120	31000	7,162	4,295	11,456	538 FRAME 16.98 SM / 120 KSI

Body Builders Layout Book

MEDIUM DUTY F-650/750

MODEL LINEUP: SUPER CAB (DIESEL)

SUPER CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-650 STRAIGHT FRAME/HYDRAULIC	179	84	49	26,000	6,506	3,630	10,136	534 FRAME 12.64 SM / 50 KSI
	203	108	70	26,000	6,651	3,650	10,301	
	215	120	75	26,000	6,724	3,660	10,384	
	221	126	75	26,000	6,760	3,665	10,425	
	239	144	81	26,000	6,868	3,681	10,549	
	245	150	87	26,000	6,905	3,685	10,590	
	251	156	87	26,000	6,941	3,691	10,632	
	281	186	120	26,000	7,311	3,858	11,169	538 FRAME 16.98 SM / 120 KSI
F-650 STRAIGHT FRAME/AIR	179	84	49	26,000	6,754	3,810	10,564	534 FRAME 12.64 SM / 50 KSI
	203	108	70	26,000	6,899	3,829	10,728	
	215	120	75	26,000	6,971	3,840	10,811	
	221	126	75	26,000	7,007	3,845	10,852	
	239	144	81	26,000	7,116	3,861	10,977	
	245	150	87	26,000	7,152	3,865	11,017	
	251	156	87	26,000	7,188	3,870	11,058	
	281	186	120	26,000	7,558	4,038	11,596	538 FRAME 16.98 SM / 120 KSI

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MEDIUM DUTY F-650/750

MODEL LINEUP: SUPER CAB (DIESEL)

SUPER CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-750 STRAIGHT FRAME/HYDRAULIC	179	84	49	31,000	6,609	3,930	10,539	535 FRAME 15.14 SM / 80 KSI
	203	108	70	31,000	6,785	3,956	10,741	
	215	120	75	31,000	6,873	3,969	10,842	
	221	126	75	31,000	6,917	3,976	10,893	
	239	144	81	31,000	7,049	3,997	11,046	
	245	150	87	31,000	7,093	3,997	11,096	
	251	156	87	31,000	7,137	4,009	11,146	
	281	186	120	31,000	7,357	4,043	11,400	
F-750 STRAIGHT FRAME/AIR	179	84	49	31,000	6,881	4,032	10,912	535 FRAME 15.14 SM / 80 KSI
	203	108	70	31,000	7,057	4,058	11,115	
	215	120	75	31,000	7,145	4,071	11,216	
	221	126	75	31,000	7,189	4,078	11,267	
	239	144	81	31,000	7,321	4,099	11,419	
	245	150	87	31,000	7,365	4,105	11,470	
	251	156	87	31,000	7,409	4,111	11,520	
	281	186	120	31,000	7,629	4,145	11,773	

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MEDIUM DUTY F-650/750

MODEL LINEUP: CREW CAB (DIESEL)

CREW CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-650 STRAIGHT FRAME/HYDRAULIC	182	72	49	26,000	7,016	3,370	10,386	534 FRAME 12.64 / 50 KSI
	194	84	49	26,000	7,037	3,447	10,484	
	212	102	70	26,000	7,069	3,563	10,632	
	218	108	70	26,000	7,079	3,602	10,681	
	230	120	75	26,000	7,100	3,679	10,779	
	236	126	75	26,000	7,111	3,718	10,829	
	248	136	81	26,000	7,132	3,796	10,928	
	260	150	87	26,000	7,153	3,873	11,026	
	266	156	87	26,000	7,163	3,912	11,075	
	278	168	100	26,000	7,184	3,989	11,173	
F-650 STRAIGHT FRAME/AIR	182	72	49	26,000	7,264	3,550	10,814	534 FRAME 12.64 SM / 50 KSI
	194	84	49	26,000	7,285	3,625	10,910	
	212	102	70	26,000	7,317	3,743	11,060	
	218	108	70	26,000	7,327	3,782	11,109	
	230	120	75	26,000	7,348	3,859	11,207	
	236	126	75	26,000	7,359	3,898	11,257	
	248	136	81	26,000	7,380	3,975	11,355	
	260	150	87	26,000	7,401	4,053	11,454	
	266	156	87	26,000	7,411	4,091	11,502	
	278	168	100	26,000	7,432	4,169	11,601	

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MEDIUM DUTY F-650/750

MODEL LINEUP: CREW CAB (DIESEL)

CREW CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-750 STRAIGHT FRAME/HYDRAULIC	182	72	49	31,000	7,011	4,083	11,094	535 FRAME 15.14 SM / 80 KSI
	194	84	49	31,000	7,048	4,108	11,156	
	212	102	70	31,000	7,103	4,146	11,249	
	218	108	70	31,000	7,121	4,159	11,280	
	230	120	75	31,000	7,158	4,184	11,342	
	236	126	75	31,000	7,177	4,197	11,374	
	248	136	81	31,000	7,214	4,222	11,436	
	260	150	87	31,000	7,251	4,248	11,499	
	266	156	87	31,000	7,269	4,261	11,530	
	278	168	100	31,000	7,306	4,286	11,592	
F-750 STRAIGHT FRAME/AIR	182	72	49	31,000	7,283	4,185	11,468	535 FRAME 15.14 SM / 80 KSI
	194	84	49	31,000	7,320	4,210	11,530	
	212	102	70	31,000	7,375	4,248	11,623	
	218	108	70	31,000	7,393	4,260	11,653	
	230	120	75	31,000	7,430	4,286	11,716	
	236	126	75	31,000	7,449	4,298	11,747	
	248	136	81	31,000	7,486	4,324	11,810	
	260	150	87	31,000	7,523	4,350	11,873	
	266	156	87	31,000	7,541	4,362	11,903	
	278	168	100	31,000	7,578	4,388	11,966	

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MEDIUM DUTY F-650/750

MODEL LINEUP: REGULAR CAB (GAS)

REGULAR CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-650 STRAIGHT FRAME	158	84	49	26,000	5,501	3,411	8,912	534 FRAME 12.64 SM / 50 KSI
	176	102	70	26,000	5,558	3,470	9,028	
	182	108	70	26,000	5,577	3,489	9,066	
	194	120	75	26,000	5,615	3,529	8,144	
	200	126	75	26,000	5,634	3,548	9,182	
	212	138	81	26,000	5,673	3,587	9,260	
	218	144	81	26,000	5,692	3,607	9,299	
	224	150	87	26,000	5,711	3,626	9,337	
	230	156	87	26,000	5,730	3,646	9,376	
	242	168	100	26,000	5,768	3,685	9,453	
	260	186	120	26,000	5,825	3,743	9,568	
	281	207	120	26,000	6,115	3,894	10,009	538 FRAME 16.98 SM / 120 KSI
F-750 STRAIGHT FRAME	158	84	49	31,000	5,635	3,604	9,239	535 FRAME 15.14 SM / 80 KSI
	176	102	70	31,000	5,651	3,716	9,367	
	182	108	70	31,000	5,670	3,739	9,409	
	194	120	75	31,000	5,708	3,785	9,493	
	200	126	75	31,000	5,727	3,809	9,536	
	212	138	81	31,000	5,765	3,855	9,620	
	218	144	81	31,000	5,784	3,879	9,663	
	224	150	87	31,000	5,803	3,902	9,705	
	230	156	87	31,000	5,919	3,828	9,747	
	242	168	100	31,000	5,860	3,972	9,832	
	260	186	120	31,000	5,959	4,000	9,959	
	281	207	120	31,000	6,190	4,143	10,333	538 FRAME 16.98 SM / 120 KSI

Body Builders Layout Book

MEDIUM DUTY F-650/750

MODEL LINEUP: SUPER CAB (GAS)

SUPER CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-650 STRAIGHT FRAME	179	84	49	26,000	5,849	3,551	9,400	534 FRAME 12.64 SM / 50 KSI
	203	108	70	26,000	5,924	3,631	9,555	
	215	120	75	26,000	5,982	3,669	9,671	
	221	126	75	26,000	6,001	3,708	9,709	
	239	144	81	26,000	6,034	3,743	9,777	
	245	150	87	26,000	6,058	3,767	9,825	
	251	156	87	26,000	6,082	3,791	9,873	
	281	186	120	26,000	6,315	4,104	10,419	538 FRAME 16.98 SM / 120 KSI
F-750 STRAIGHT FRAME	179	84	49	31,000	5,892	3,846	9,738	535 FRAME 15.14 SM / 80 KSI
	203	108	70	31,000	6,033	3,875	9,908	
	215	120	75	31,000	6,103	3,890	9,993	
	221	126	75	31,000	6,138	3,897	10,035	
	239	144	81	31,000	6,255	3,920	10,175	
	245	150	87	31,000	6,279	3,925	10,204	
	251	156	87	31,000	6,323	3,928	10,251	
	281	186	120	31,000	6,476	3,975	10,451	538 FRAME 16.98 SM / 120 KSI

Body Builders Layout Book

MEDIUM DUTY F-650/750

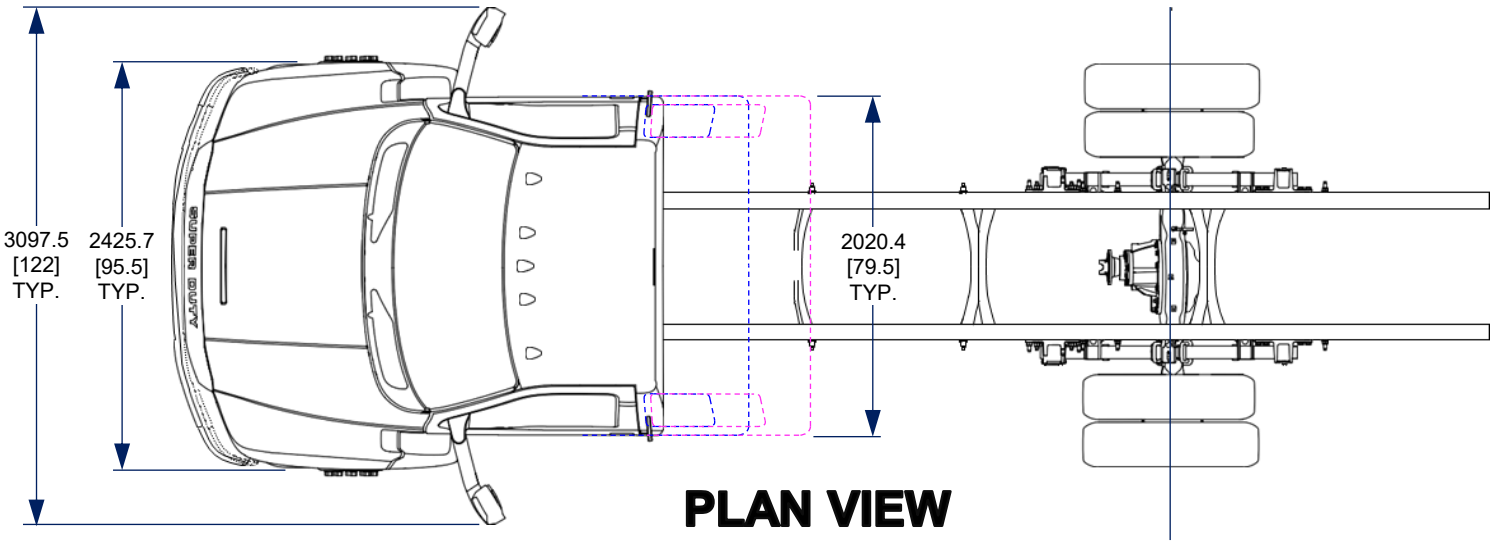
MODEL LINEUP: CREW CAB (GAS)

CREW CAB	WHEELBASE in.	CA in.	AF in.	GVWR pounds	FRONT CURB pounds	REAR CURB pounds	BASE CURB pounds	COMMENTS
F-650 STRAIGHT FRAME	182	72	49	26,000	6,085	3,616	9,701	534 FRAME 12.64 SM / 50 KSI
	194	84	49	26,000	6,123	3,657	9,780	
	212	102	70	26,000	6,181	3,715	9,896	
	218	108	70	26,000	6,200	3,734	9,934	
	230	120	75	26,000	6,238	3,773	10,011	
	236	126	75	26,000	6,262	3,797	10,059	
	248	136	81	26,000	6,300	3,837	10,137	
	260	150	87	26,000	6,333	3,872	10,205	
	266	156	87	26,000	6,357	3,895	10,252	
	278	168	100	26,000	6,405	3,943	10,348	
F-750 STRAIGHT FRAME	182	72	49	31,000	6,145	3,898	10,043	535 FRAME 15.14 SM / 80 KSI
	194	84	49	31,000	6,216	3,912	10,128	
	212	102	70	31,000	6,321	3,912	10,256	
	218	108	70	31,000	6,357	3,935	10,299	
	230	120	75	31,000	6,427	3,955	10,382	
	236	126	75	31,000	6,451	3,979	10,430	
	248	136	81	31,000	6,521	3,993	10,514	
	260	150	87	31,000	662	3,991	10,593	
	266	156	87	31,000	6,626	4,017	10,643	
	278	168	100	31,000	6,674	4,069	10,743	

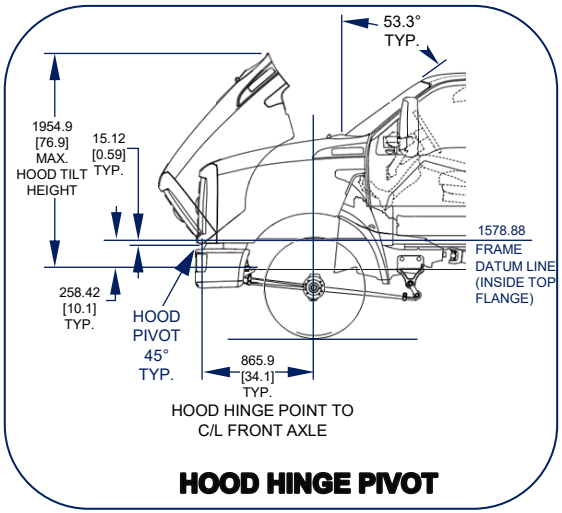
Body Builders Layout Book

MEDIUM DUTY F-650/750

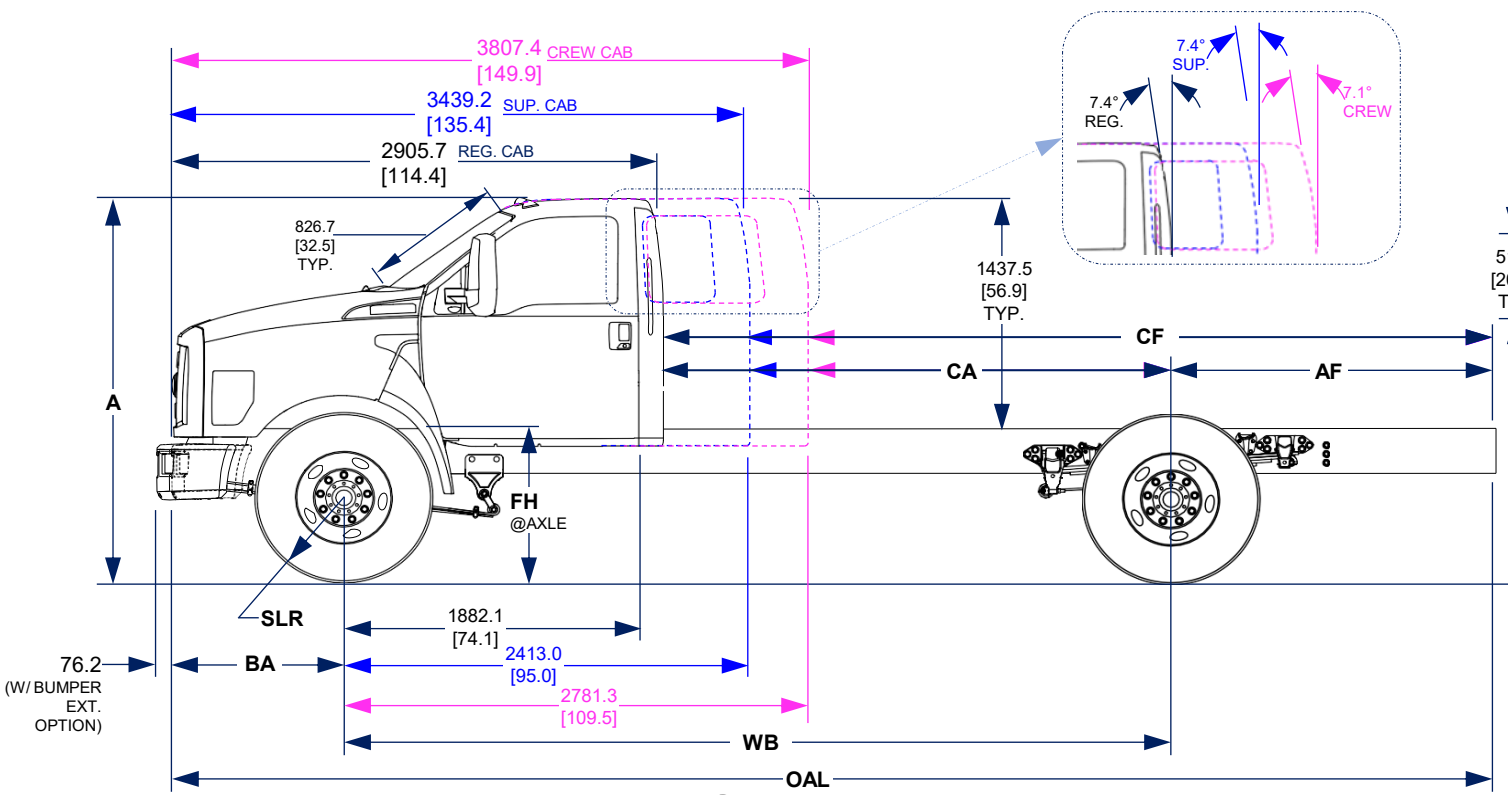
DIMENSIONAL DATA: REGULAR, SUPER & CREW CAB



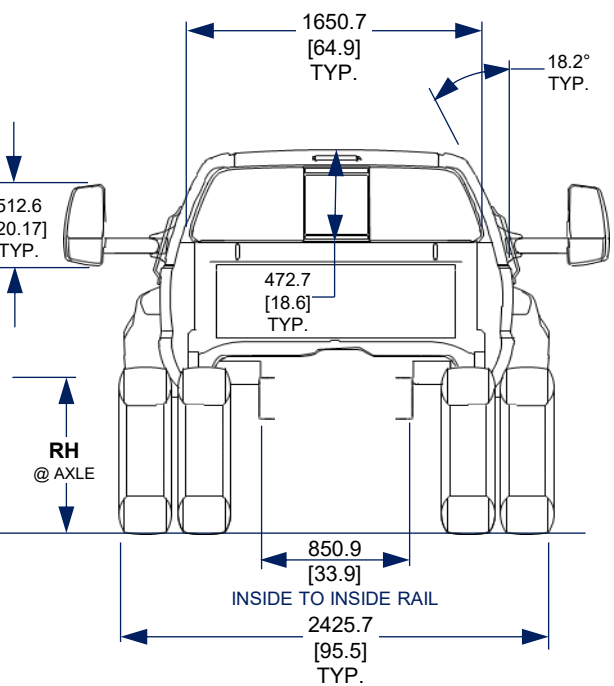
PLAN VIEW



HOOD HINGE PIVOT



SIDE VIEW



REAR VIEW

NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

MEDIUM DUTY F-650/750

DIMENSIONAL DATA: RIDE HEIGHT, CAB HEIGHT & FRAME LENGTH

FRONT RIDE HEIGHTS, FH @ Axle									REGULAR CAB		SUPER CAB		CREW CAB	
MODEL	STD FRONT TIRE	GVWR	FRONT AXLE	SPRING CAPACITY	EMPTY REG CAB mm [in.]	EMPTY SUPER CAB mm [in.]	EMPTY CREW CAB mm [in.]	LOADED ALL CAB mm [in.]	CAB HEIGHT VALUE "A" EMPTY	CAB HEIGH VALUE "A" LOADED	CAB HEIGHT VALUE "A" EMPTY	CAB HEIGHT VALUE "A" LOADED	CAB HEIGHT VALUE "A" EMPTY	CAB HEIGHT VALUE "A" LOADED
F-650 W/19.5" WHEELS (8.5" FRAME)	245/70 R19.5	24,000 - 27500	8,500	8,500	840.0 [33.1]	839.0 [33.0]	838.0 [33.0]	805.0 [31.7]	2310.7 [91.0]	2273.3 [89.5]	2309.2 [90.9]	2275.4 [89.6]	2308.0 [90.9]	2282.5 [89.9]
		25,500 - 29000	10,000	10,000	842.5 [33.2]	844.0 [33.2]	843.0 [33.2]	795.9 [31.3]	2314.4 [91.1]	2266.7 [89.2]	2313.1 [91.1]	2268.5 [89.3]	2311.9 [91.0]	277.31 [89.6]
F650 W/22.5" WHEELS (9.5" FRAME)	11 R22.5	25,500 - 31001	8,500	8,500	935.0 [36.8]	935.0 [36.8]	932.0 [36.7]	903.0 [35.6]	2406.2 [94.7]	2374.2 [93.2]	2403.9 [94.6]	2373.3 [93.4]	2403.7 [94.6]	2373.3 [93.4]
			10,000	10,000	940.0 [37.0]	939.0 [37.0]	938.0 [36.9]	894.0 [35.2]	2409.9 [94.9]	2368.2 [93.2]	2408.5 [94.8]	2367.2 [93.2]	2407.7 [94.8]	2366.3 [93.2]
F750 (9.5" FRAME)	11 R22.5	31,000 - 35000	10,000	10,000	940.0 [37.0]	938.0 [36.9]	938.0 [36.9]	894.0 [35.2]	2410.9 [94.9]	2367.5 [93.2]	2408.6 [94.8]	2368.2 [93.2]	2408.5 [94.8]	2366.3 [93.2]
		33,000 - 36200	12,000	12,000	949.0 [37.4]	947.0 [37.3]	947.0 [37.3]	896.0 [35.3]	2417.6 [95.2]	2369.5 [93.3]	2415.6 [95.1]	2368.0 [93.2]	2415.5 [95.1]	2367.9 [93.2]
		36,200 - 37000	14,000	14,000	954.0 [37.6]	953.0 [37.5]	953.0 [37.5]	895.0 [35.2]	2421.3 [95.3]	2368.2 [93.2]	2420.1 [95.3]	2367.2 [93.2]	2420.2 [95.3]	2367.1 [93.2]

REAR RIDE HEIGHTS, RH @ Axle							
MODEL	STD REAR TIRE	GVWR	REAR AXLE	SPRING CAPACITY	EMPTY REG CAB	LOADED ALL CAB	SUSPTYPE
F650 WITH 10.125“ ST FRAME	11 R22.5	27,500 - 33000	17,500	19,000	961.0 [37.8]	928.0 [36.5]	MULTI-LEAF
			17,500	19,000	960.0 [37.8]	928.0 [36.5]	MULTI-LEAF
			19,000	19,000	957.0 [37.7]	921.0 [36.9]	MULTI-LEAF
			19,000	19,000	956.0 [37.6]	921.0 [36.9]	MULTI-LEAF
			19,000	21,000	970.0 [38.2]	936.9 [36.9]	MULTI-LEAF
			19,000	21,000	969.0 [38.1]	936.9 [36.9]	MULTI-LEAF
F750 WITH 10.125“ ST FRAME	11 R22.5	31,000 - 37000	21,000	21,000	965.0 [38.0]	928.0 [36.5]	MULTI-LEAF
			21,000	21,000	964.0 [38.0]	928.0 [36.5]	MULTI-LEAF
			23,000	23,000	971.0 [38.2]	934.9 [36.8]	MULTI-LEAF
			26,000	31,000	973.0 [38.3]	942.9 [37.1]	MULTI-LEAF

NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

MEDIUM DUTY F-650/750

DIMENSIONAL DATA: RIDE HEIGHT, CAB HEIGHT & FRAME LENGTH

REGULAR CAB CONFIGURATION

WB		BA		CF		CA		AF		OAL	
[in]	mm	[in]	mm	[in]	mm	[in]	mm	[in]	mm	[in]	mm
146	3,708	40	1,026	111	2,819	72	1,829	39	991	225	5,725
158	4,013	40	1,026	123	3,124	84	2,134	39	991	237	6,029
158	4,013	40	1,026	133	3,378	84	2,134	49	1,245	247	6,283
158	4,013	40	1,026	147	3,734	84	2,134	63	1,600	261	6,639
176	4,470	40	1,026	172	4,369	102	2,591	70	1,778	286	7,274
182	4,623	40	1,026	178	4,521	108	2,743	70	1,778	292	7,426
182	4,623	40	1,026	183	4,648	108	2,743	75	1,905	297	7,553
194	4,928	40	1,026	195	4,953	120	3,048	75	1,905	309	7,858
194	4,928	40	1,026	195	4,953	120	3,048	75	1,905	309	7,858
200	5,080	40	1,026	201	5,105	126	3,200	75	1,905	315	8,011
212	5,385	40	1,026	219	5,563	138	3,505	81	2,057	333	8,468
218	5,537	40	1,026	225	5,715	144	3,658	81	2,057	339	8,620
218	5,537	40	1,026	225	5,715	144	3,658	81	2,057	339	8,620
224	5,690	40	1,026	237	6,020	150	3,810	87	2,210	351	8,925
230	5,842	40	1,026	243	6,172	156	3,962	87	2,210	357	9,077
242	6,147	40	1,026	268	6,807	168	4,267	100	2,540	382	9,712
242	6,147	40	1,026	268	6,807	168	4,267	100	2,540	382	9,712
260	6,604	40	1,026	279	7,087	186	4,724	93	2,362	393	9,992
260	6,604	40	1,026	306	7,772	186	4,724	120	3,048	420	10,678
281	7,137	40	1,026	327	8,306	207	5,258	120	3,048	441	11,211

CREW CAB CONFIGURATION

WB		BA		CF		CA		AF		OAL	
[in]	mm	[in]	mm	[in]	mm	[in]	mm	[in]	mm	[in]	mm
182	4,623	40	1,026	111	2,819	72	1,829	39	991	261	6,639
182	4,623	40	1,026	121	3,073	72	1,829	49	1,245	271	6,893
194	4,928	40	1,026	133	3,378	84	2,134	49	1,245	283	7,198
194	4,928	40	1,026	147	3,734	84	2,134	63	1,600	297	7,553
212	5,385	40	1,026	172	4,369	102	2,591	70	1,778	322	8,188
218	5,537	40	1,026	178	4,521	108	2,743	70	1,778	328	8,341
218	5,537	40	1,026	183	4,648	108	2,743	75	1,905	333	8,468
230	5,842	40	1,026	195	4,953	120	3,048	75	1,905	345	8,773
236	5,994	40	1,026	201	5,105	126	3,200	75	1,905	351	8,925
248	6,299	40	1,026	219	5,563	138	3,505	81	2,057	369	9,382
254	6,452	40	1,026	225	5,715	144	3,658	81	2,057	375	9,535
260	6,604	40	1,026	237	6,020	150	3,810	87	2,210	387	9,839
266	6,756	40	1,026	243	6,172	156	3,962	87	2,210	393	9,992
278	7,061	40	1,026	268	6,807	168	4,267	100	2,540	418	10,627

SUPER CAB CONFIGURATION

WB		BA		CF		CA		AF		OAL	
[in]	mm	[in]	mm	[in]	mm	[in]	mm	[in]	mm	[in]	mm
167	4,242	40	1,026	111	2,819	72	1,829	39	991	246	6,258
179	4,547	40	1,026	123	3,124	84	2,134	39	991	258	6,563
179	4,547	40	1,026	133	3,378	84	2,134	49	1,245	268	6,817
179	4,547	40	1,026	147	3,736	84	2,136	63	1,600	282	7,172
203	5,156	40	1,026	178	4,524	108	2,746	70	1,778	313	7,960
203	5,156	40	1,026	183	4,651	108	2,746	75	1,905	318	8,087
215	5,461	40	1,026	195	4,950	120	3,045	75	1,905	330	8,392
221	5,613	40	1,026	201	5,100	126	3,195	75	1,905	336	8,544
239	6,071	40	1,026	225	5,715	144	3,658	81	2,057	360	9,154
239	6,071	40	1,026	225	5,715	144	3,658	81	2,057	360	9,154
245	6,223	40	1,026	237	6,020	150	3,810	87	2,210	372	9,458
251	6,375	40	1,026	243	6,172	156	3,962	87	2,210	378	9,611
281	7,137	40	1,026	306	7,772	186	4,724	120	3,048	441	11,211

NOTE- [ ] DIMENSION ARE INCHES

MEDIUM DUTY F-650/750

DIMENSIONAL DATA: SPRING CAPACITIES

FRONT SPRING IDENTIFICATION AND CAPACITY RATINGS

FRONT SUSPENSION CAPACITY AT GROUND (i.e., SPRINGS/BRACKETS LBS)	TOTAL NO. OF LEAVES	TOTAL SPRING PACK THICKNESS AT PAD - IN	ONE SPRING CAPACITY AT PAD - LBS	ONE SPRING CAPACITY AT GROUND - LBS
8,500	2	3.64	3,825	4,250
10,000	2	3.60	4,500	5,000
12,000	2	3.62	5,400	6,000
13,200	3	3.62	5,940	6,600
14,000	3	3.68	6,300	7,000

REAR SPRING IDENTIFICATION AND CAPACITY RATING

	PER AXLE END					
FULL SUSPENSION CAPACITY AT GROUND (i.e., SPRINGS/BRACKETS LBS)	TOTAL NO. OF LEAVES MAIN SPRING	TOTAL SPRING PACK THICKNESS AT PAD - IN	MAIN SPRING CAPACITY AT PAD - LBS	AUXILIARY SPRING CAPACITY AT PAD LBS	MAIN & AUXILIARY COMBINATION CAPACITY AT PAD - LBS	MAIN & AUXILIARY COMBINATION CAPACITY AT GROUND - LBS
15,500	9	7.17	5,350	1,450	6,800	7,750
19,000	10	7.74	7,097	1,450	8,547	9,500
21,000	10	8.03	7,991	1,450	9,441	10,500
23,000	10	8.30	8,805	1,450	10,255	11,500
31,000	10	9.05	12,551	1,450	14,001	15,500

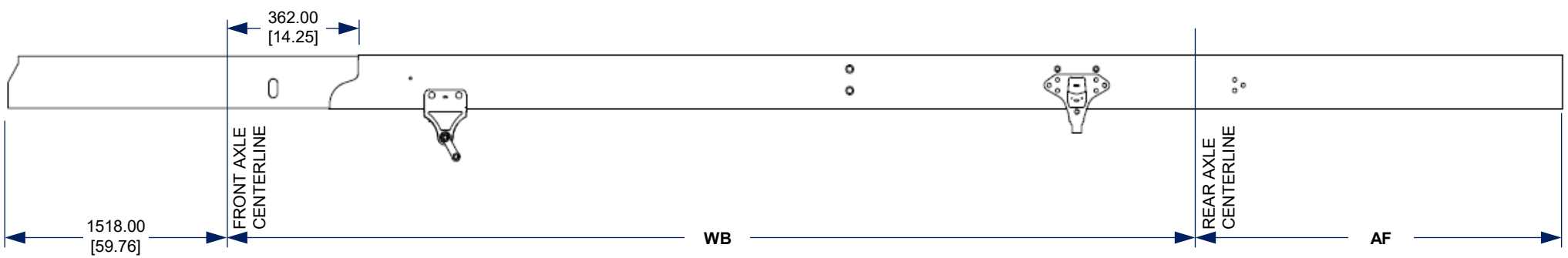
NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

MEDIUM DUTY F-650/750

FRAME: RAIL PROFILES

ORDER CODE	DIMENSION A mm [in]	DIMENSION B mm [in]	DIMENSION C mm [in]	SECTION MODULUS [in3]	YIELD [psi]	BENDING MOMENT [in. -lbs]
533	77.8 [3.06]	231.8 [9.13]	7.9 [0.31]	10.75	80, 000	859,200
534	77.8 [3.06]	257.2 [10.13]	7.9 [0.31]	12.64	50,000	632,000
536	90.9 [3.58]	257.2 [10.13]	7.9 [0.31]	14.18	120,000	1,701,600
535	78.5 [3.09]	260.4 [10.25]	9.5 [0.38]	15.14	80,000	1,211,200
539	94.0 [3.70]	263.6 [10.38]	11.1 [0.44]	20.11	120,000	2,413,200
537	77.8 [3.06]	231.8 [9.13]	8.0 [0.31]	10.75	80,000	860,000
538	91.7 [3.61]	260.4 [10.25]	9.5 [0.38]	16.98	120,000	2,038,000



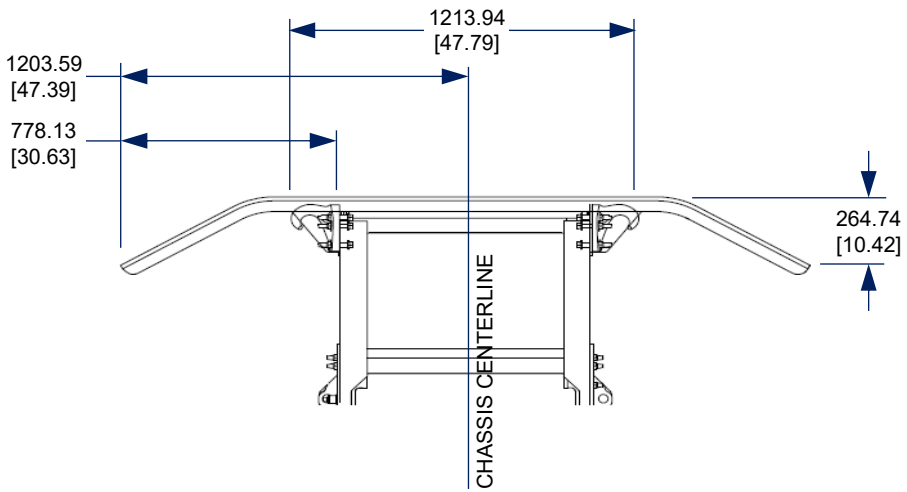
REINFORCED SECTION FRAME RAIL W/ INTEGRAL EXTENSION

NOTE- [ ] DIMENSION ARE INCHES

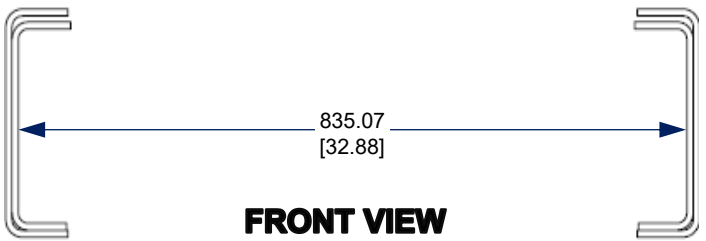
Body Builders Layout Book

MEDIUM DUTY F-650/750

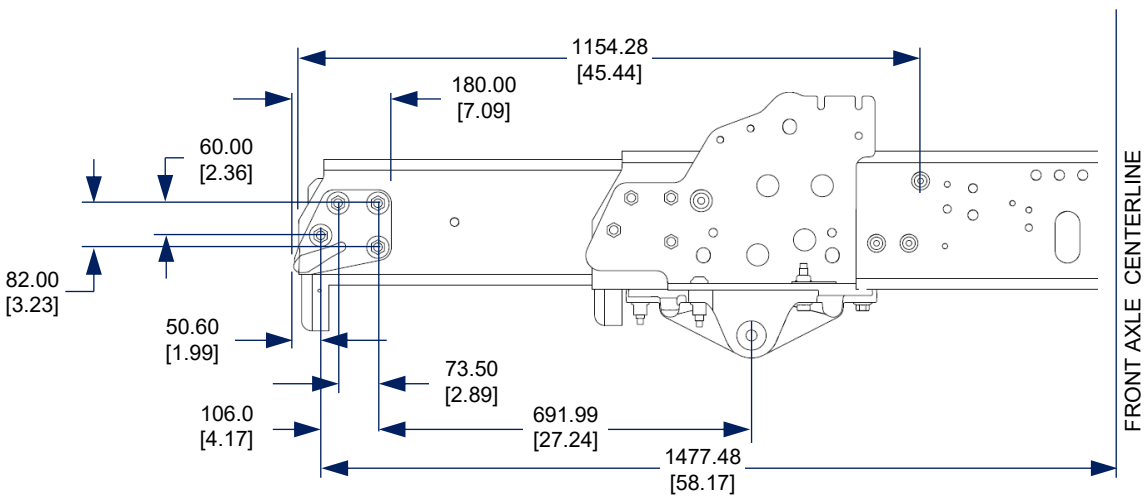
FRAME: FRONT EXTENSION – 20 INCH BOLT-ON



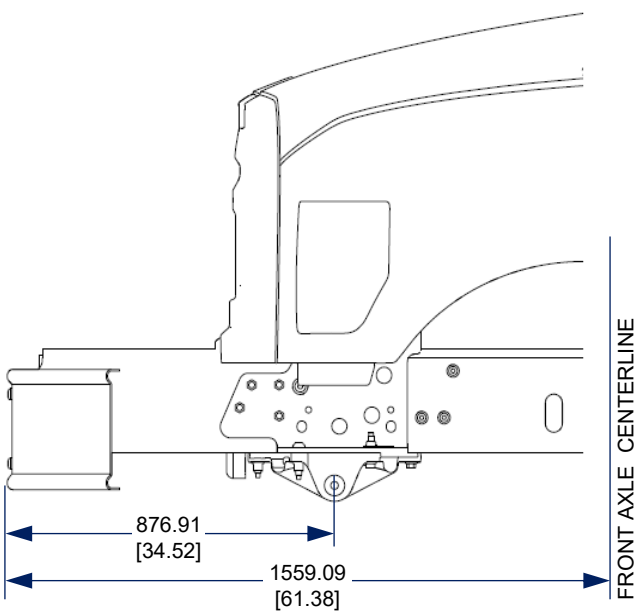
PLAN VIEW



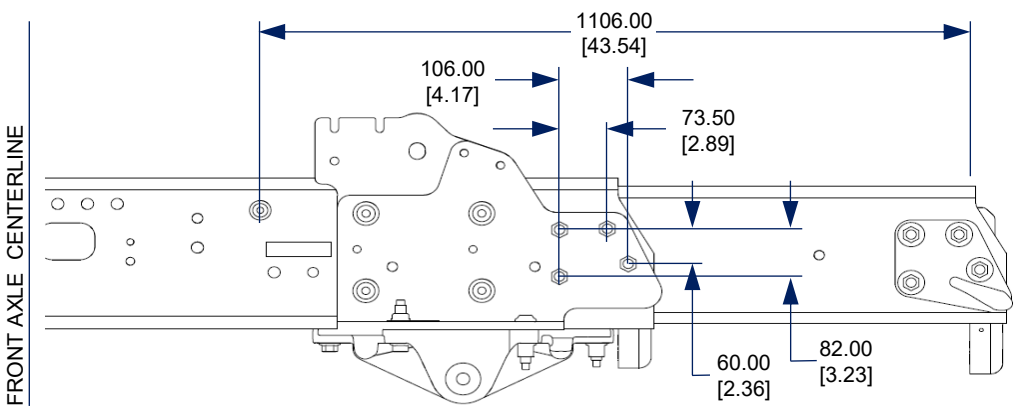
FRONT VIEW



LH SIDE VIEW



LH SIDE VIEW WITH HOOD



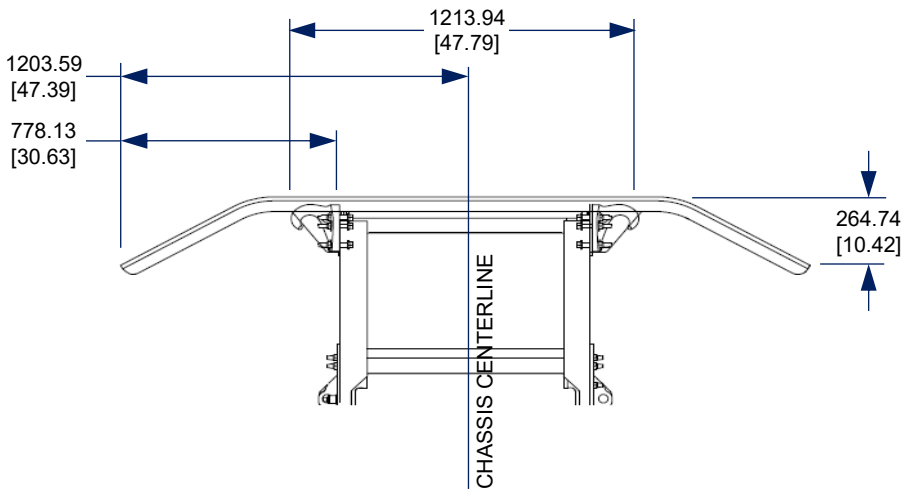
RH SIDE VIEW

NOTE- [ ] DIMENSION ARE INCHES

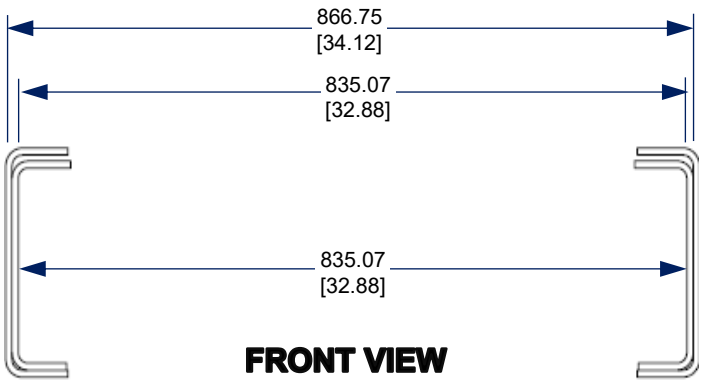
Body Builders Layout Book

MEDIUM DUTY F-650/750

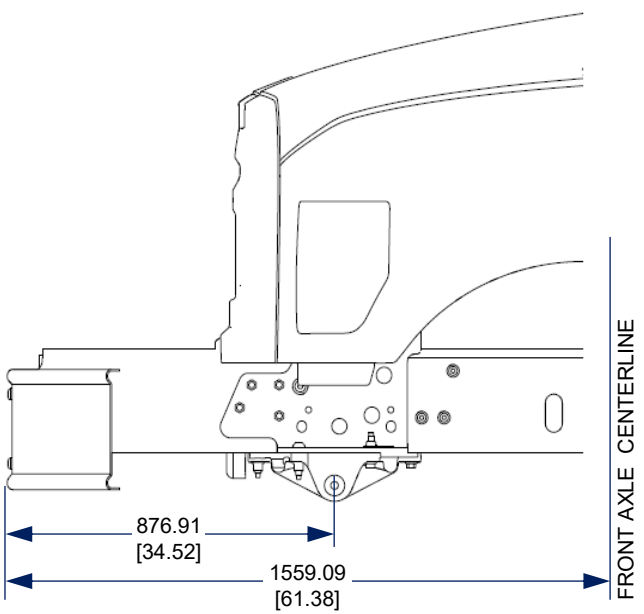
FRAME: INTEGRAL EXTENSION – 20 INCH



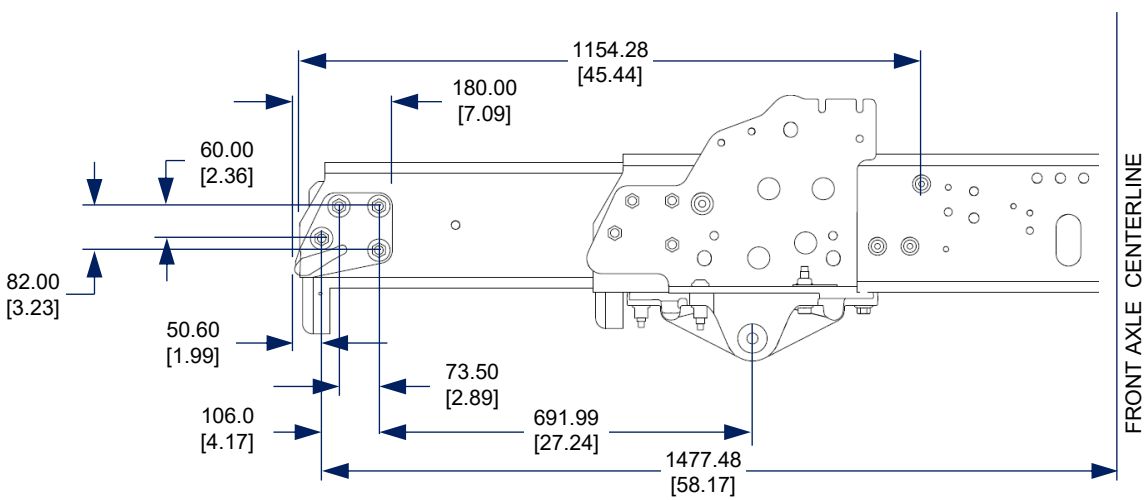
PLAN VIEW



FRONT VIEW



LH SIDE VIEW WITH HOOD



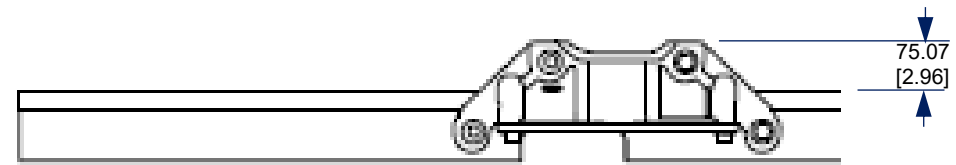
LH SIDE VIEW
(RH SIDE TYP)

NOTE- [ ] DIMENSION ARE INCHES

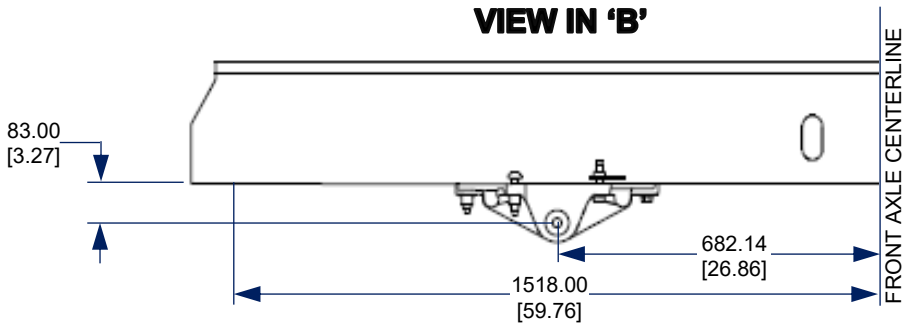
Body Builders Layout Book

MEDIUM DUTY F-650/750

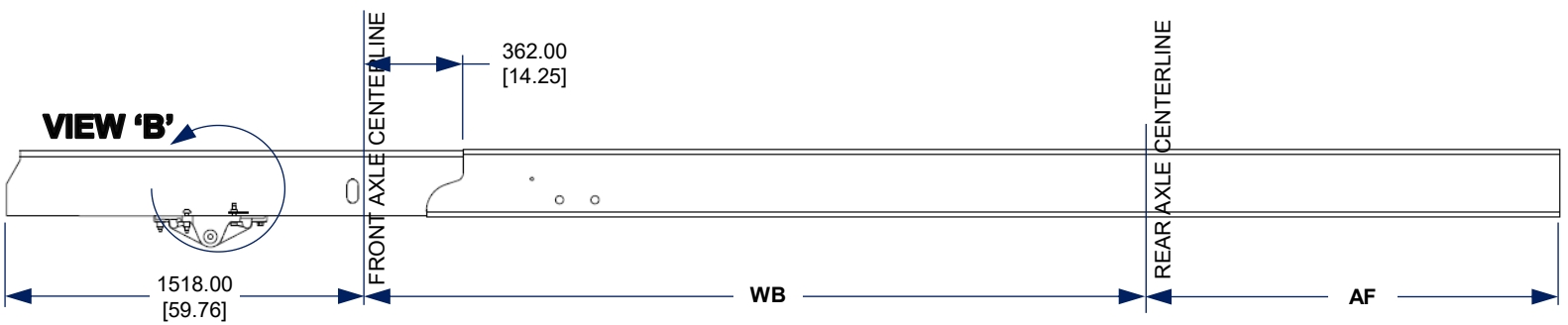
FRAME: WITH REINFORCEMENT & INTEGRAL FRONT EXTENSION



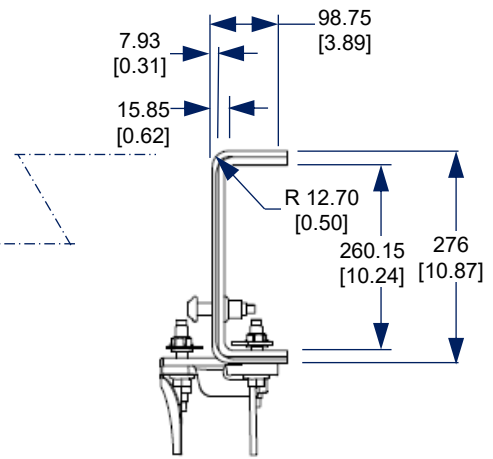
VIEW IN 'A'



PLAN VIEW



SIDE VIEW



CHASSIS MODIFICATIONS:
Stability Control is specifically calibrated and validated only for your vehicle's original configuration. If you alter your vehicle's chassis components, for example, a wheelbase extension or reduction, tag axle addition or removal, a major body change such as conversion of a tractor into a truck. **Ford Motor Company is not responsible for the performance of the stability control system if you modify any major components such as axle, suspension or steering system.**

GENERAL RECOMMENDATIONS FOR MOUNTING:
Please see the latest General Body Builder Layout Book - Design Recommendations for more information regarding best practices. Pay particular attention to:
- Suspension and Steering System – for important Front-End Alignment note
- Frame – for modification recommendation

REGULAR CAB				SUPER CAB				CREW CAB			
WB		AF		WB		AF		WB		AF	
mm [in]		mm [in]		mm [in]		mm [in]		mm [in]		mm [in]	
4013	[158]	1245	[49]	4547	[179]	1244	[49]	4623	[182]	1245	[49]
4470	[176]	1778	[70]	5003	[197]	1778	[70]	4928	[194]	1245	[49]
4623	[182]	1778	[70]	5156	[203]	1778	[70]	5385	[212]	1778	[70]
4927	[194]	1905	[75]	5461	[215]	1905	[75]	5537	[218]	1778	[70]
5080	[200]	1905	[75]	5613	[221]	1905	[75]	5842	[230]	1905	[75]
5384	[212]	2057	[81]	5918	[233]	2057	[81]	5994	[236]	1905	[75]
5537	[218]	2057	[81]	6071	[239]	2057	[81]	6299	[248]	2057	[81]
5689	[224]	2209	[87]	6223	[245]	2210	[87]	6452	[254]	2057	[81]
5842	[230]	2209	[87]	6375	[251]	2210	[87]	6604	[260]	2210	[87]
6146	[242]	2540	[100]	6680	[263]	2540	[100]	6756	[266]	2210	[87]
6604	[260]	3048	[120]	7137	[281]	3048	[120]				
7137	[281]	3048	[120]								

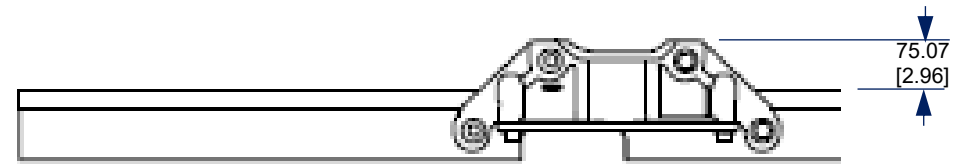
THICKNESS SIDE MEMBER MM [IN]	SECTION MODULUS CUBIC INCH	TYPE FRAME	MAX GVWR LBS.
7.9 [0.31]	29.2	10.866	37,000

NOTE- [ ] DIMENSION ARE INCHES

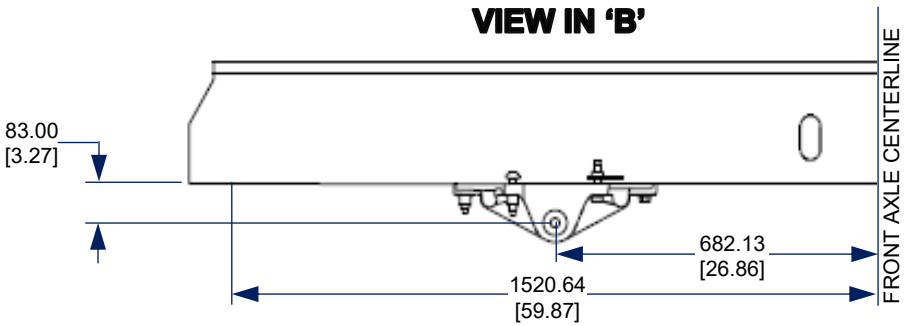
Body Builders Layout Book

MEDIUM DUTY F-650/750

FRAME: WITHOUT REINFORCEMENT

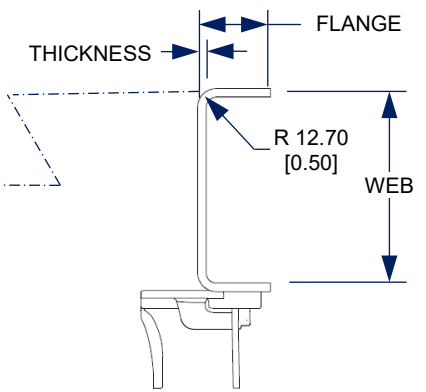


VIEW IN 'A'



PLAN VIEW

SIDE VIEW



CHASSIS MODIFICATIONS:
Stability Control is specifically calibrated and validated only for your vehicle's original configuration. If you alter your vehicle's chassis components, for example, a wheelbase extension or reduction, tag axle addition or removal, a major body change such as conversion of a tractor into a truck. **Ford Motor Company is not responsible for the performance of the stability control system if you modify any major components such as axle, suspension or steering system.**

GENERAL RECOMMENDATIONS FOR MOUNTING:
Please see the latest General Body Builder Layout Book - Design Recommendations for more information regarding best practices. Pay particular attention to:

- Suspension and Steering System – for important Front-End Alignment note
- Frame – for modification recommendation

THICKNESS SIDE MEMBER MM [IN]	SECTION MODULUS CUBIC INCH	TYPE FRAME	MAX GVWR LBS.
7.9 [0.31]	29.2	10.866	37,000

REGULAR CAB				SUPER CAB				CREW CAB			
WB		AF		WB		AF		WB		AF	
mm [in]		mm [in]		mm [in]		mm [in]		mm [in]		mm [in]	
3708	[146]	991	[39]	4242	[167]	991	[39]	4623	[182]	991	[39]
4013	[158]	991	[39]	4547	[179]	991	[39]	4623	[182]	1245	[49]
4013	[158]	1245	[49]	4547	[179]	1245	[49]	4928	[194]	1245	[49]
4470	[176]	1778	[70]	5004	[197]	1778	[70]	5385	[212]	1778	[70]
4623	[182]	1778	[70]	5156	[203]	1778	[70]	5537	[218]	1778	[70]
4928	[194]	1905	[75]	5461	[215]	1905	[75]	5842	[230]	1905	[75]
5080	[200]	1905	[75]	5613	[221]	1905	[75]	5994	[236]	1905	[75]
5385	[212]	2057	[81]	5918	[233.0]	2057	[81]	6299	[248]	2057	[81]
5537	[218]	2057	[81]	6071	[239]	2057	[81]	6452	[254]	2057	[81]
5690	[224]	2210	[87]	6223	[245]	2209	[87]	6604	[260]	2210	[87]
5842	[230]	2210	[87]	6375	[251]	2210	[87]	6756	[266]	2210	[87]
6147	[242]	2540	[100]	6680	[263]	2540	[100]	7061	[278]	2540	[100]
6604	[260]	2362	[93]	7137	[281]	3048	[120]				
6604	[260]	3048	[120]								
7137	[281]	3048	[120]								

NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

MEDIUM DUTY F-650/750

FRAME: WITHOUT REINFORCEMENT

REGULAR CAB				SUPER CAB				CREW CAB			
WB		AF		WB		AF		WB		AF	
mm [in]		mm [in]		mm [in]		mm [in]		mm [in]		mm [in]	
3708	[146]	991	[39]	4242	[167]	991	[39]	4629	[182]	991	[39]
4013	[158]	991	[39]	4547	[179]	991	[39]	4623	[182]	1245	[49]
4013	[158]	1245	[49]	4547	[179]	1245	[49]	4928	[194]	1245	[49]
4470	[176]	1778	[70]	5004	[197]	1778	[70]	5385	[212]	1778	[70]
4623	[182]	1778	[70]	5156	[203]	1778	[70]	5537	[218]	1778	[70]
4928	[194]	1905	[75]	5461	[215]	1905	[75]	5842	[230]	1905	[75]
5080	[200]	1905	[75]	5613	[221]	1905	[75]	5994	[236]	1905	[75]
5385	[212]	2057	[81]	5918	[233.0]	2057	[81]	6299	[248]	2057	[81]
5537	[218]	2057	[81]	6071	[239]	2057	[81]	6452	[254]	2057	[81]
5690	[224]	2210	[87]	6223	[245]	2210	[87]	6604	[260]	2210	[87]
5842	[230]	2210	[87]	6375	[251]	2210	[87]	6756	[266]	2210	[87]
6147	[242]	2540	[100]	6680	[263]	2540	[100]	7061	[278]	2540	[100]
6604	[260]	2362	[93]	7137	[281]	3048	[120]				
6604	[260]	3048	[120]								
7137	[281]	3048	[120]								

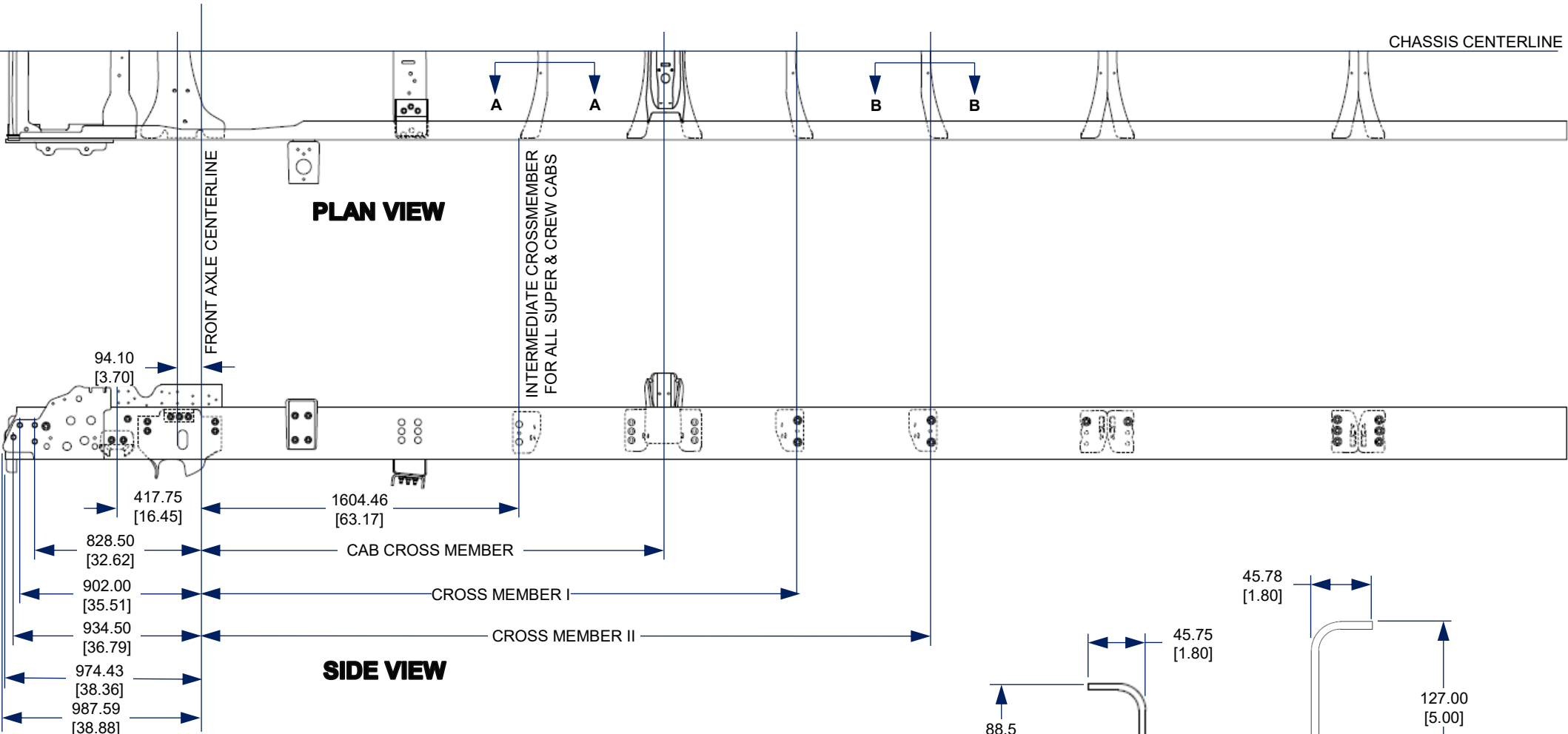
MODEL	THICKNESS SIDE MEMBER MM [IN]	WEB SIDE MEMBER MM [IN]	FLANGE SIDE MEMBER MM [IN]	SECTION MODULUS CUBIC INCH	TYPE FRAME	MAX GVWR LBS.	COMMENT
F650, F750	7.9 [0.31]	257.2 [10.13]	90.9 [3.58]	14.18	10.125	37,000	
F650, F750	9.5 [0.38]	260.4 [10.25]	78.5 [3.09]	15.14	10.25	37,000	
F650	7.9 [0.31]	231.8 [9.126]	77.8 [3.06]	10.75	9.125	29,000	
F650	7.9 [0.31]	257.2 [10.13]	77.8 [3.06]	12.64	10.125	29,000	
F750	11.1 [0.44]	263.6 [10.38]	94.0 [3.70]	20.11	10.378	37,000	
F650, F750	9.5 [0.38]	260.4 [10.25]	91.7 [3.61]	16.98	10.25	37,000	F650 281 WB ONLY

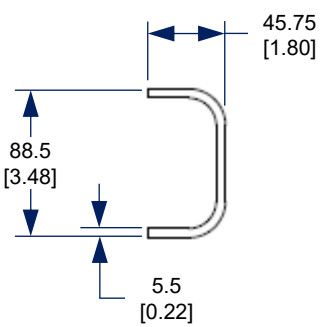
NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

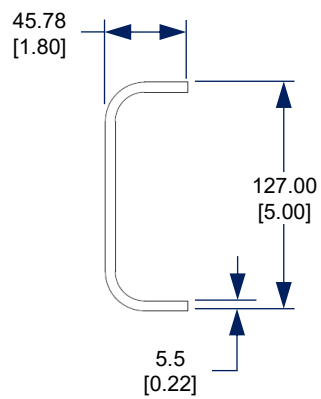
MEDIUM DUTY F-650/750

FRAME: DOCK HEIGHT (GAS & DIESEL)





SECTION A-A
INTERMEDIATE CROSSMEMBER
FOR ALL SUPER & CREW CABS



SECTION B-B
CENTERLINE OF CROSS MEMBER
I & II

NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

MEDIUM DUTY F-650/750

FRAME: DOCK HEIGHT (GAS & DIESEL)

CAB CROSSMEMBER	
REGULAR CAB	1759.84 [69.29]
SUPER CAB	2291.2 [90.2]
CREW CAB	2659.62 [104.71]

REGULAR CAB	CROSSMEMBER		
WB RANGE	I	II	III
3708.4	2331.0 [91.8]	-	-
4013.2	2582.0 [101.7]	-	-
4470.4	2779.0 [109.4]	-	-
4622.8	2779.0 [109.4]	-	-
4927.6	3003.0 [118.2]	-	-
5080.0	2810.9 [110.7]	3675.0 [144.7]	-
5384.8	2810.9 [110.7]	3675.0 [144.7]	-
5537.2	2810.9 [110.7]	4123.0 [162.3]	-
5689.6	2810.9 [110.7]	4123.0 [162.3]	-
5842.0	2810.9 [110.7]	4123.0 [162.3]	-
6146.8	3003.0 [118.2]	4571.0 [180.0]	-
6604.0	2810.9 [110.7]	3899.0 [153.5]	5019.0 [197.6]
7137.4	2810.9 [110.7]	4123.0 [162.3]	5423.0 [213.5]

SUPER CAB	CROSSMEMBER		
WB RANGE	I	II	III
4241.8	-	-	-
4546.6	3003.0 [118.2]	-	-
5003.8	3003.0 [118.2]	3675.0 [144.7]	-
5156.2	3003.0 [118.2]	3675.0 [144.7]	-
5461.0	3003.0 [118.2]	4123.0 [162.3]	-
5613.4	3003.0 [118.2]	4123.0 [162.3]	-
5918.2	3003.0 [118.2]	4123.0 [162.3]	-
6070.6	3003.0 [118.2]	4171.0 [164.2]	-
6223.0	3003.0 [118.2]	4571.0 [180.0]	-
6375.4	3003.0 [118.2]	4571.0 [180.0]	-
6680.2	3003.0 [118.2]	3899.0 [153.5]	5019.0 [197.6]
7137.4	3003.0 [118.2]	4123.0 [162.3]	5691.0 [224.1]

CREW CAB	CROSSMEMBER		
WB RANGE	I	II	III
4622.8	-	-	-
4927.6	3451.0 [135.9]	-	-
5384.8	3675.0 [144.7]	-	-
5537.2	3899.0 [153.5]	-	-
5842.0	4347.0 [171.1]	-	-
5994.4	4347.0 [171.1]	-	-
6299.2	3451.0 [135.9]	4571.0 [180.0]	-
6451.6	3451.0 [135.9]	4571.0 [180.0]	-
6604.0	3899.0 [153.5]	5019.0 [197.6]	-
6756.4	3899.0 [153.5]	5019.0 [197.6]	-
7061.2	4123.0 [162.3]	5243.0 [206.4]	-

NOTE- [ ] DIMENSION ARE INCHES

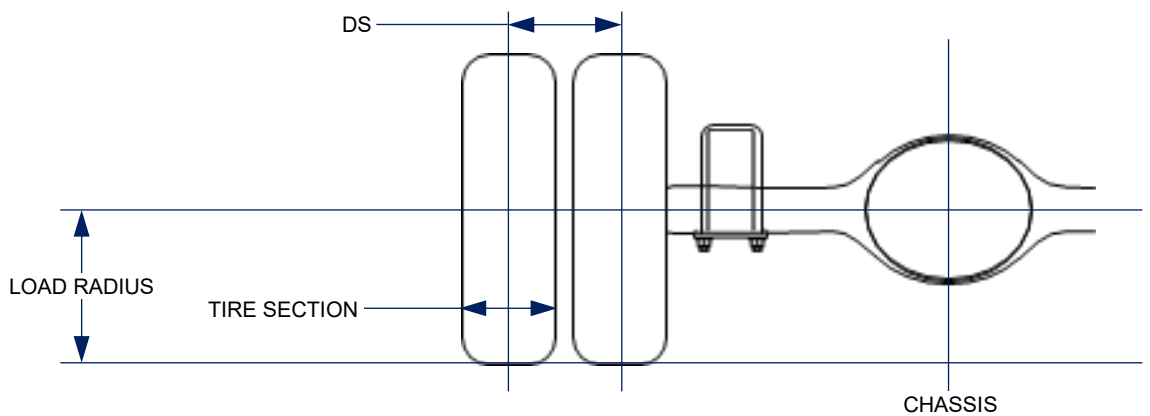
Body Builders Layout Book

MEDIUM DUTY F-650/750

DIMENSIONAL DATA: AXLE TRACK

FRONT AXLE TRACK

							FRONT AXLE TRACK							
							8,500 lb.				10,000 - 14,000 lb.			
							BRAKE TYPE				BRAKE TYPE			
	WHEEL		DISC THICKNESS		WHEEL OFFSET		AIR		HYD		AIR		HYD (10-12K)	
DISC	inner	WHEEL TYPE	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
19.5 x 6.75	Steel	8H	0.43	11.0	5.60	142.2	-	-	84.0	2,133	-	-	-	-
19.5 x 6.75	Aluminum	8H	0.71	18.0	5.55	141.0	85.0	2,156	85.0	2,156	83.8	2,128	84.0	2,134
19.5 x 7.50	Steel	10H	0.43	11.0	6.40	162.6	81.0	2,057	81.0	2,057	82.1	2,084	82.3	2,090
19.5 x 7.50	Aluminum	10H	0.87	22.2	6.10	155.0	82.5	2,094	82.5	2,094	81.8	2,079	82.1	2,085
22.5 x 8.25	Steel	10H	0.42	10.7	6.20	168.2	80.5	2,045	80.5	2,045	83.5	2,122	83.8	2,128
22.5 x 8.25	Aluminum	10H	0.81	20.5	6.59	167.6	81.3	2,066	81.3	2,066	82.4	2,094	82.7	2,100



REAR AXLE DUAL TIRE / WHEEL

REAR AXLE TRACK

												REAR AXLE TRACK							
				DISC THICKNESS		DISC THICKNESS		WHEEL OFFSET		DUAL SPACING		BRAKE TYPE				BRAKE TYPE			
				(inner)		(outer)		(inner)		(DS)		AIR		HYD		AIR		HYD	
DISC	WHEEL (inner)	WHEEL (outer)	WHEEL TYPE	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
19.5x6.75	Steel	Steel	8H	0.43	11.0	0.43	11.0	5.60	142.2	11.20	284.5	-	-	72.6	1844	-	-	-	-
19.5x6.75	Steel	Aluminum	8H	0.43	11.0	0.71	18.0	5.60	142.2	11.15	283.2								
19.5x6.75	Aluminum	Aluminum	8H	0.71	18.0	0.71	18.0	5.55	141.0	11.10	282.0								
19.5x7.50	Steel	Steel	10H	0.43	11.0	0.43	11.0	6.40	162.6	12.80	325.1	72.7	1848	72.6	1844	-	-	-	-
19.5x7.50	Steel	Aluminum	10H	0.43	11.0	0.87	22.2	6.40	162.6	12.50	317.6	73.0	1853	72.8	1849	-	-	-	-
19.5x7.50	Aluminum	Aluminum	10H	0.87	22.2	0.87	22.2	6.10	155.0	12.20	310.0								
22.5x8.25	Steel	Steel	10H	0.42	10.7	0.42	10.7	6.20	168.2	13.24	336.3	72.7	1847	72.6	1843	72.7	1847	-	-
22.5x8.25	Steel	Aluminum	10H	0.42	10.7	0.81	20.0	6.20	168.2	13.22	335.8	72.9	1853	72.8	1849	72.9	1853	-	-
22.5x8.25	Aluminum	Aluminum	10H	0.81	20.0	0.81	20.0	6.59	167.6	13.20	335.2								

NOTE- [ ] DIMENSION ARE INCHES

Ford PRO

Body Builders Layout Book

MEDIUM DUTY F-650/750

DIMENSIONAL DATA: TIRE DIMENSIONS AND WHEEL/TIRE RATINGS

TIRE DIMENSIONS

SIZE	MAX INFL (PSI)	MAX FORD RIM (IN.)	CS MAX GROWN OVERALL WIDTH (IN.)	OD MAX GROWN DEEP TRACTION TREAD (IN.)	SLR (IN.)	RPM
245/70R19.5G	110	7.5	10.24	34.06	15.5	630
245/70R19.5H	120	7.5	10.24	34.06	15.5	630
265/70R19.5G	110	7.5	10.83	34.96	15.8	614
11R22.5G	105	8.25	11.88	42.82	19.7	497
11R22.5H	120	8.25	11.88	42.82	19.5	497
255/70R22.5H	120	8.25	10.55	37.44	17.4	565
295/75R22.5H	120	8.25	12.32	41.10	18.9	512
275/80R22.5G	110	8.25	11.42	41.02	18.8	515

WHEEL & TIRE RATINGS

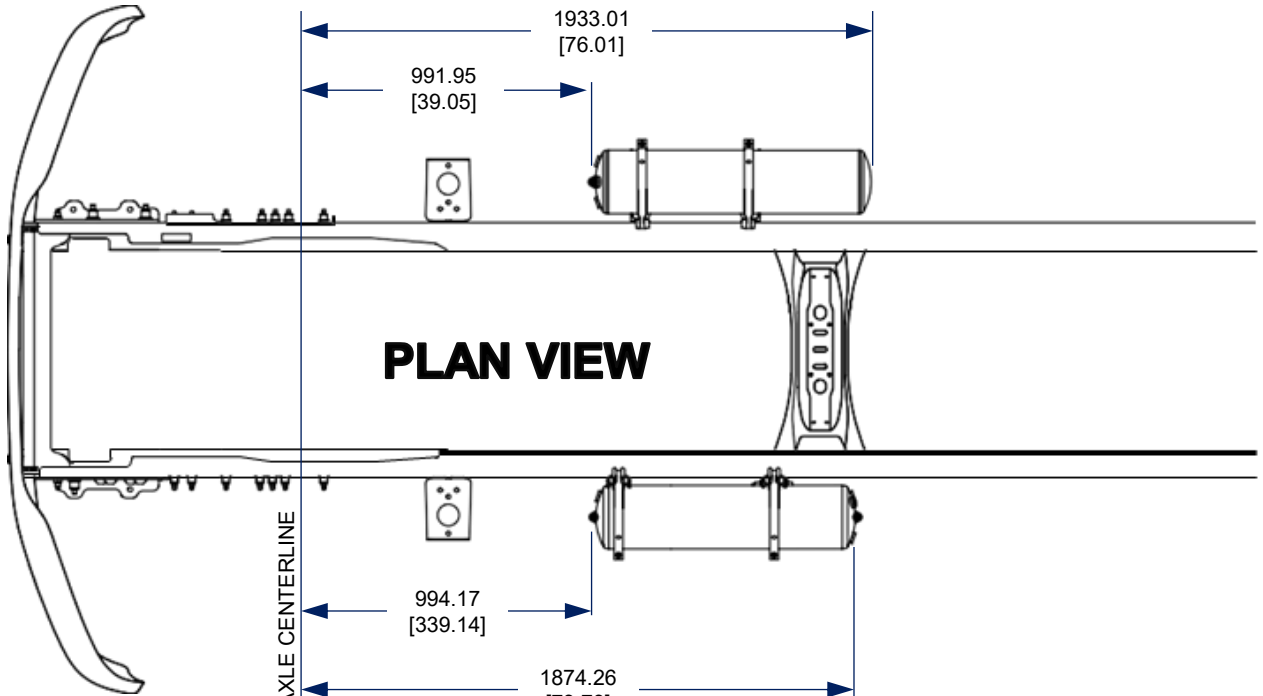
TIRE SIZE, LOAD RANGE (PR)	WHEEL WIDTH (in.)	TYPE	MAXIMUM TIRE & WHEEL CAPACITY PER AXLE (lb) @ PSI	
			FRONT	REAR
245/70R19.5 G	6.75 in. 8 stud	STEEL	9,080 @ 110 psi	17,200 @ 110 psi
	6.75 in 8 stud	ALUMINUM	9,080 @ 110 psi	17,200 @ 110 psi
	7.50 in. 10 stud	STEEL	9,080 @ 110 psi	17,200 @ 110 psi
	7.50 in. 10 stud	ALUMINUM	9,080 @ 110 psi	17,200 @ 110 psi
245/70R19.5 H	6.75 in. 8 stud	STEEL	9,610 @ 120 psi	18,160 @ 120 psi
	6.75 in 8 stud	ALUMINUM	9,610 @ 120 psi	18,160 @ 120 psi
	7.50 in. 10 stud	STEEL	9,610 @ 120 psi	18,160 @ 120 psi
	7.50 in. 10 stud	ALUMINUM	9,610 @ 120 psi	18,160 @ 120 psi
265/70R19.5 G	6.75 in. 8 stud	STEEL	10,140 @ 110 psi	18,700 @ 110 psi
	6.75 in 8 stud	ALUMINUM	10,140 @ 110 psi	18,700 @ 110 psi
	7.50 in. 10 stud	STEEL	10,140 @ 110 psi	18,700 @ 110 psi
	7.50 in. 10 stud	ALUMINUM	10,140 @ 110 psi	18,700 @ 110 psi
11R22.5 G	8.25 in. 10 stud	STEEL	12,350 @ 105 psi	23,360 @ 105 psi
	8.25 in. 10 stud	ALUMINUM	12,350 @ 105 psi	23,360 @ 105 psi
11R22.5 H	8.25 in. 10 stud	STEEL	13,220 @ 120 psi	24,020 @ 120 psi
	8.25 in. 10 stud	ALUMINUM	13,220 @ 120 psi	24,020 @ 120 psi
255/70R22.5 H	8.25 in. 10 stud	STEEL	11,020 @ 120 psi	20,280 @ 120 psi
	8.25 in. 10 stud	ALUMINUM	11,020 @ 120 psi	20,280 @ 120 psi
275/80R22.5 G	8.25 in. 10 stud	STEEL	12,350 @ 110 psi	22,700 @ 110 psi
	8.25 in. 10 stud	ALUMINUM	12,350 @ 110 psi	22,700 @ 110 psi
295/75R22.5H	8.25 in. 10 stud	STEEL	13,220 @ 120psi	24,020 @ 120 psi
	8.25 in. 10 stud	ALUMINUM	13,220 @ 120 psi	

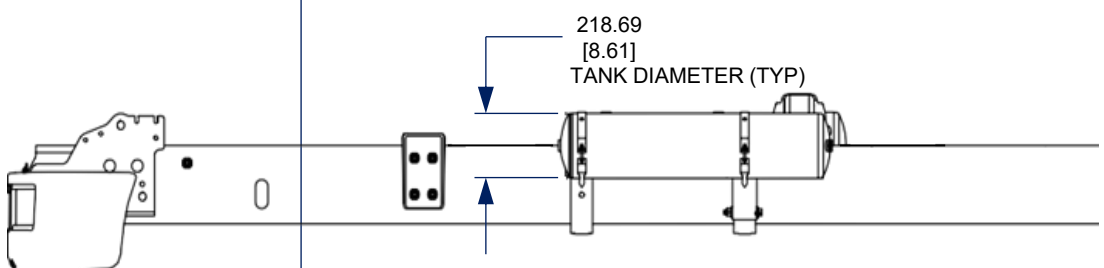
NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

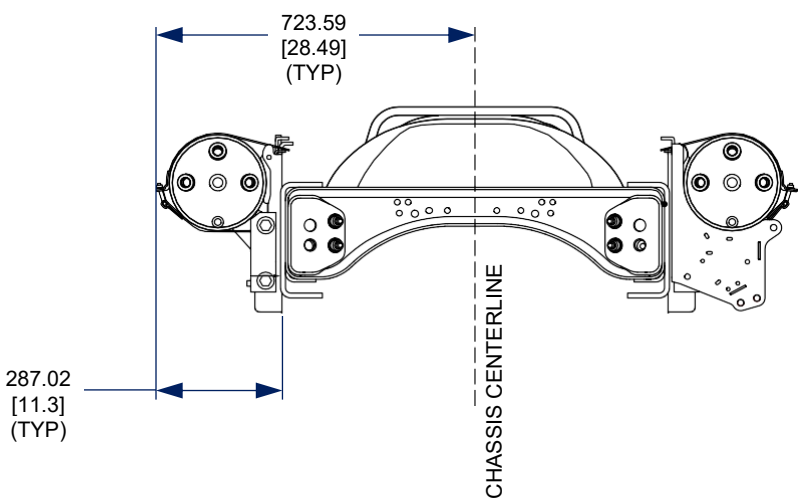
MEDIUM DUTY F-650/750

AIR TANK LOCATIONS: REGULAR CAB





SIDE VIEW



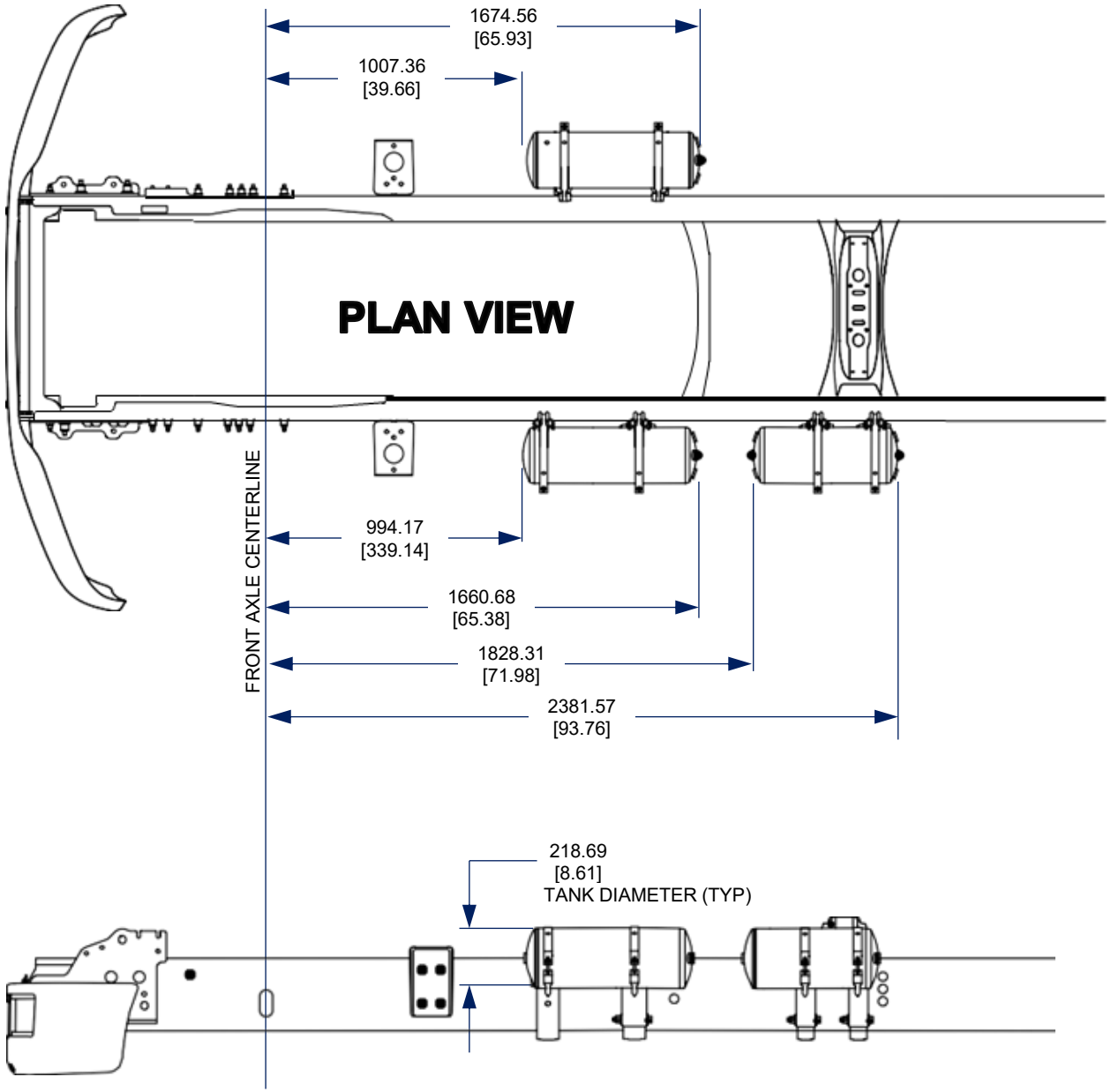
REAR VIEW

NOTE- [ ] DIMENSION ARE INCHES

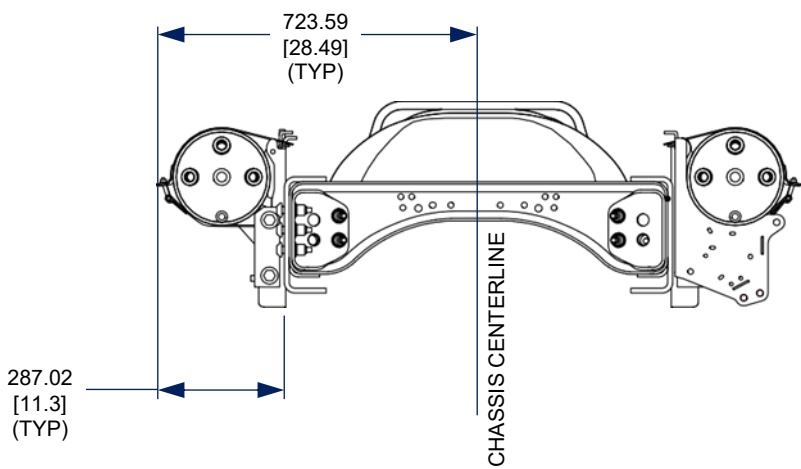
Body Builders Layout Book

MEDIUM DUTY F-650/750

AIR TANK LOCATIONS: SUPER CAB



SIDE VIEW



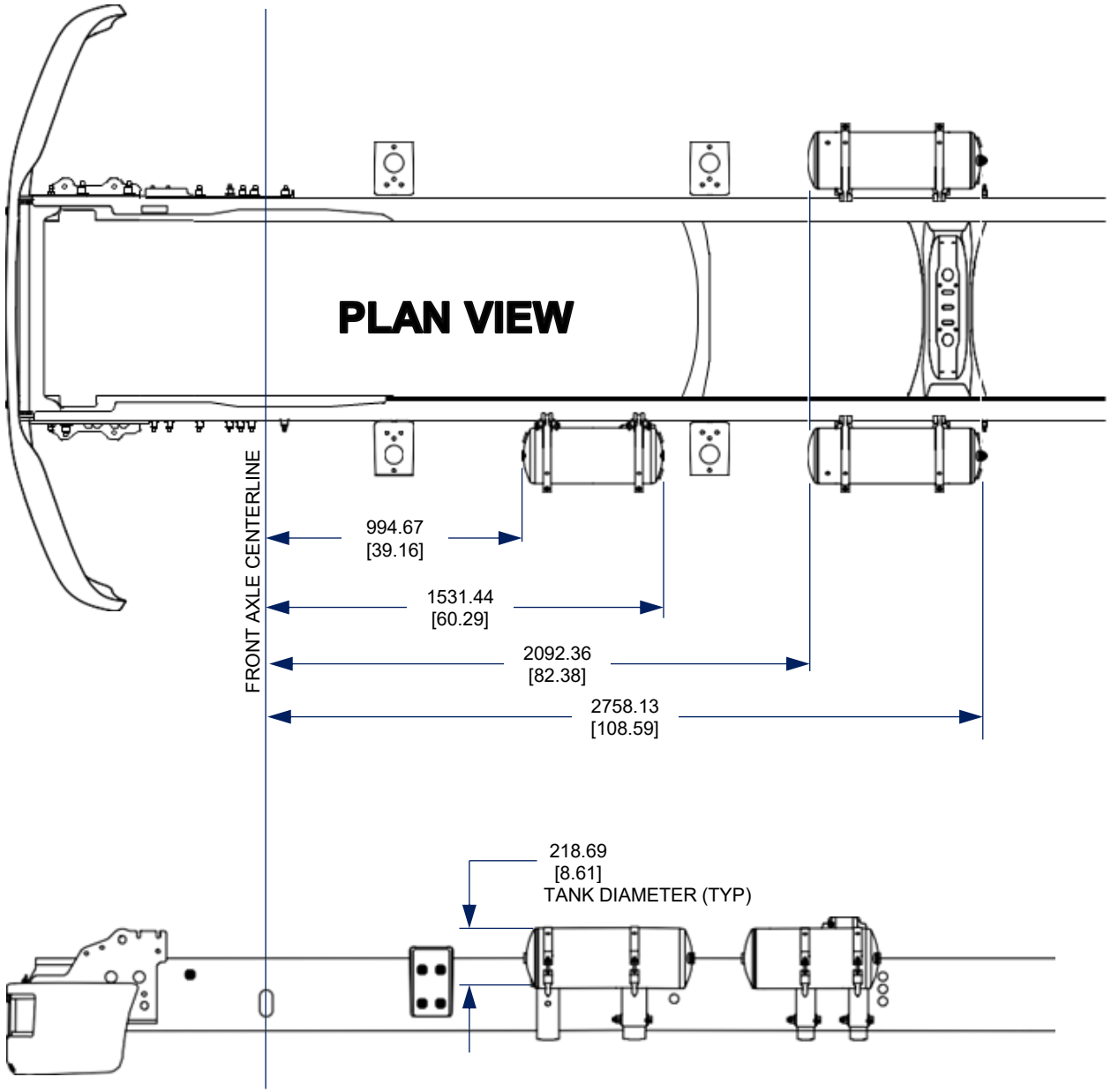
REAR VIEW

NOTE- [ ] DIMENSION ARE INCHES

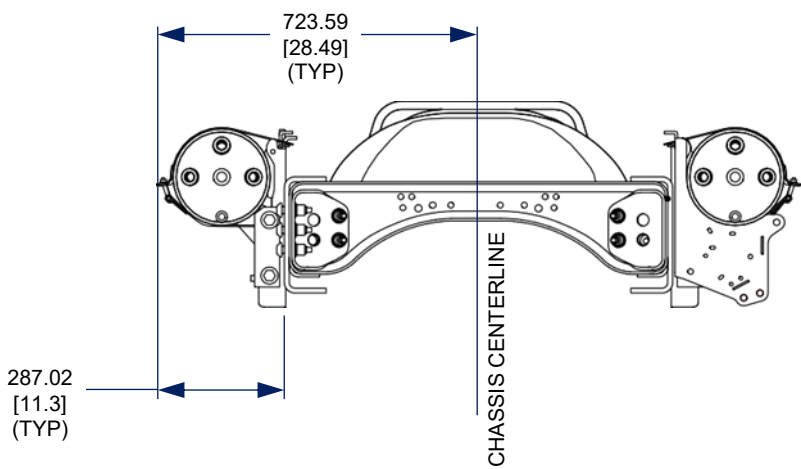
Body Builders Layout Book

MEDIUM DUTY F-650/750

AIR TANK LOCATIONS: CREW CAB



SIDE VIEW



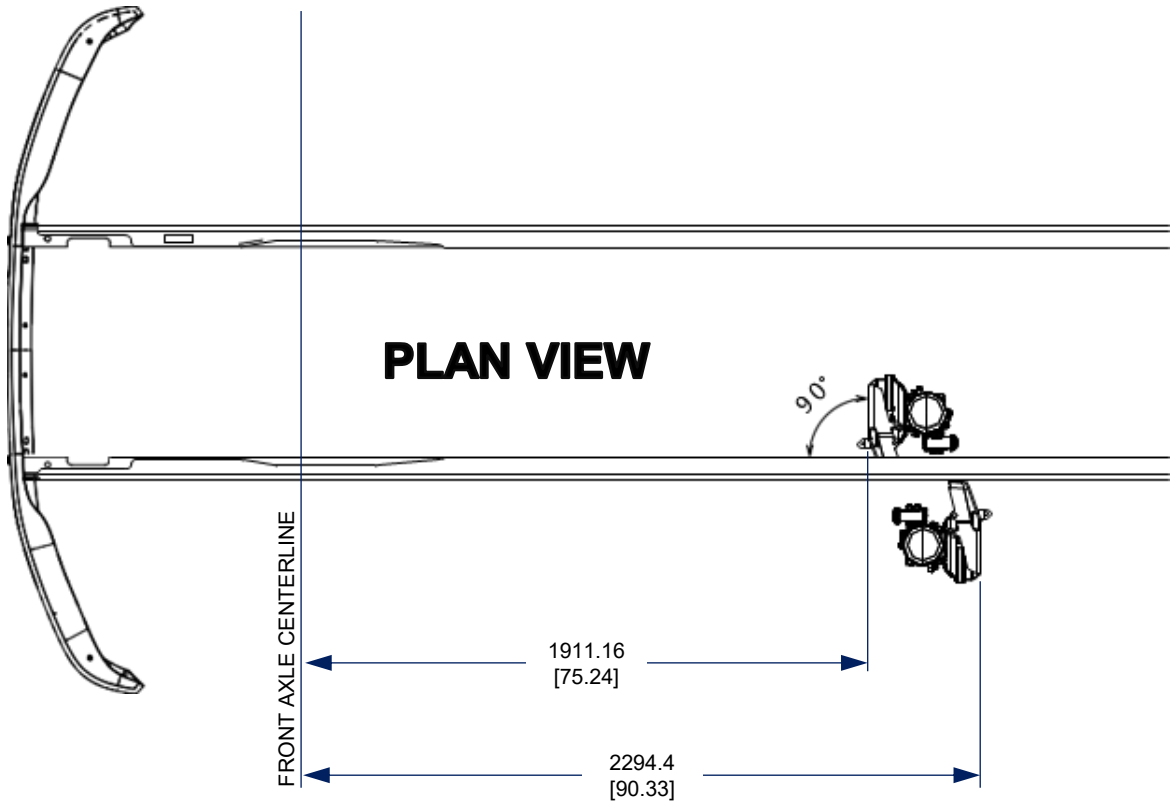
REAR VIEW

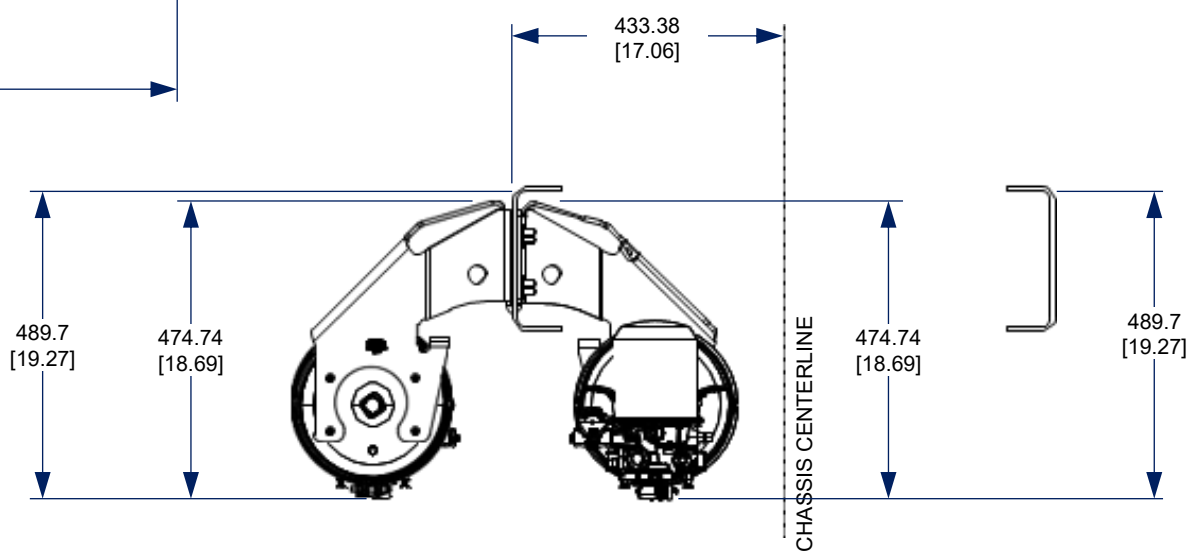
NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

MEDIUM DUTY F-650/750

AIR DRYER LOCATION





REAR VIEW

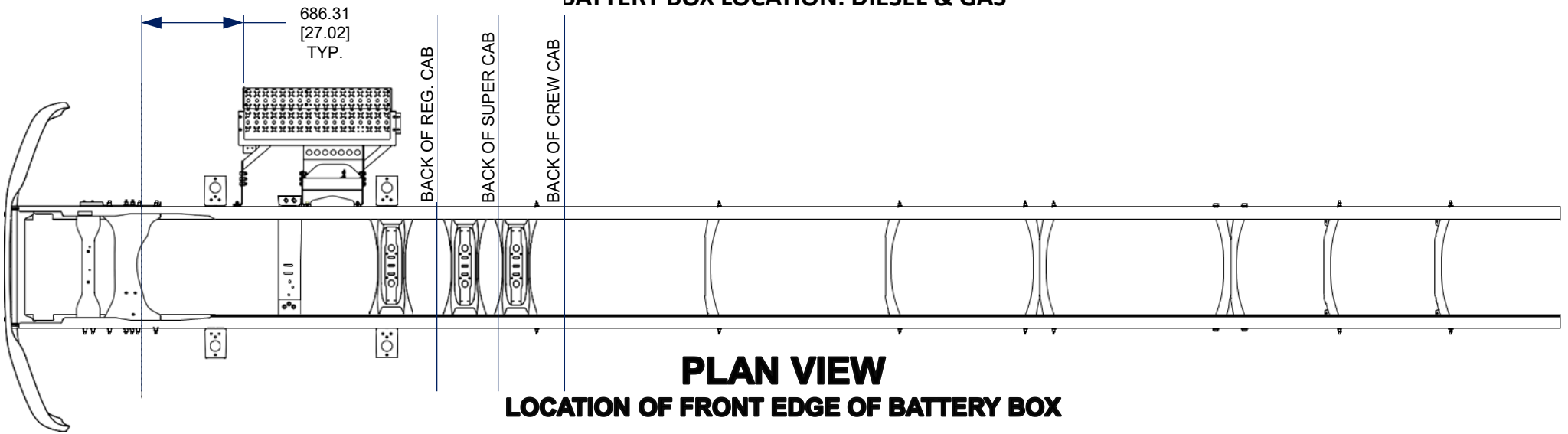
INSIDE / OUTSIDE FRAME RAIL DIMENSIONS

NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

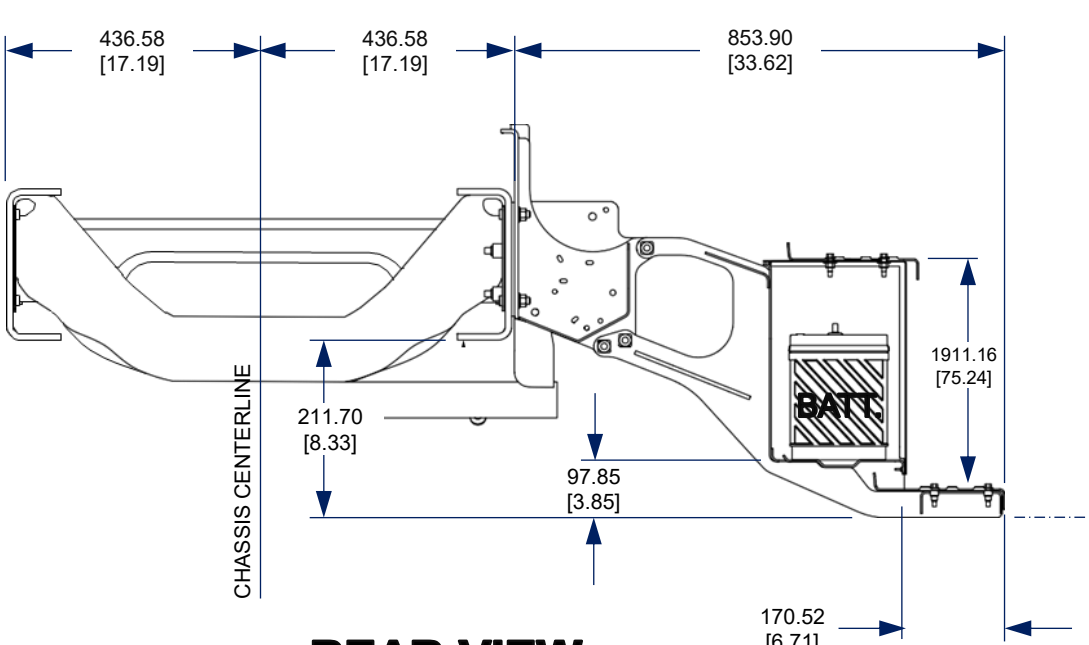
MEDIUM DUTY F-650/750

BATTERY BOX LOCATION: DIESEL & GAS



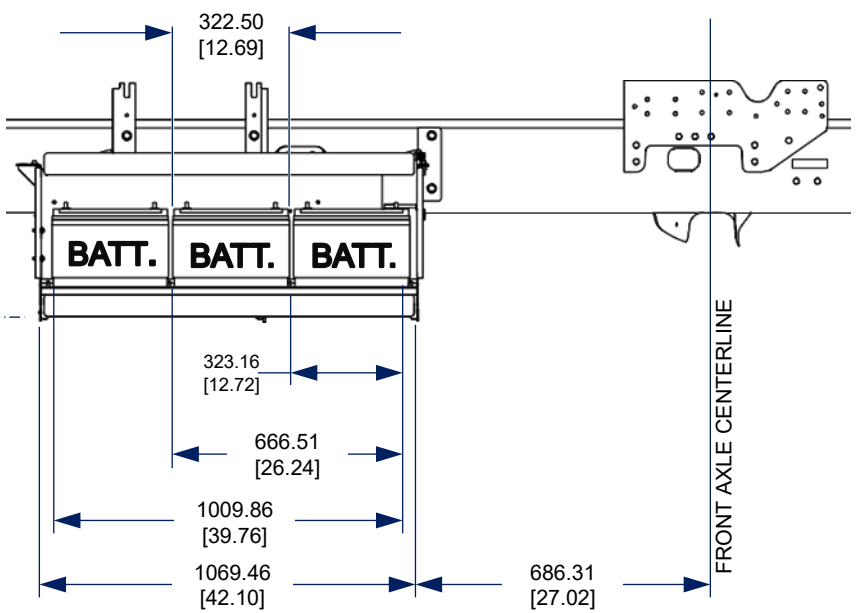
PLAN VIEW

LOCATION OF FRONT EDGE OF BATTERY BOX



REAR VIEW

OUTSIDE FRAME RAIL DIMENSIONS



SIDE VIEW

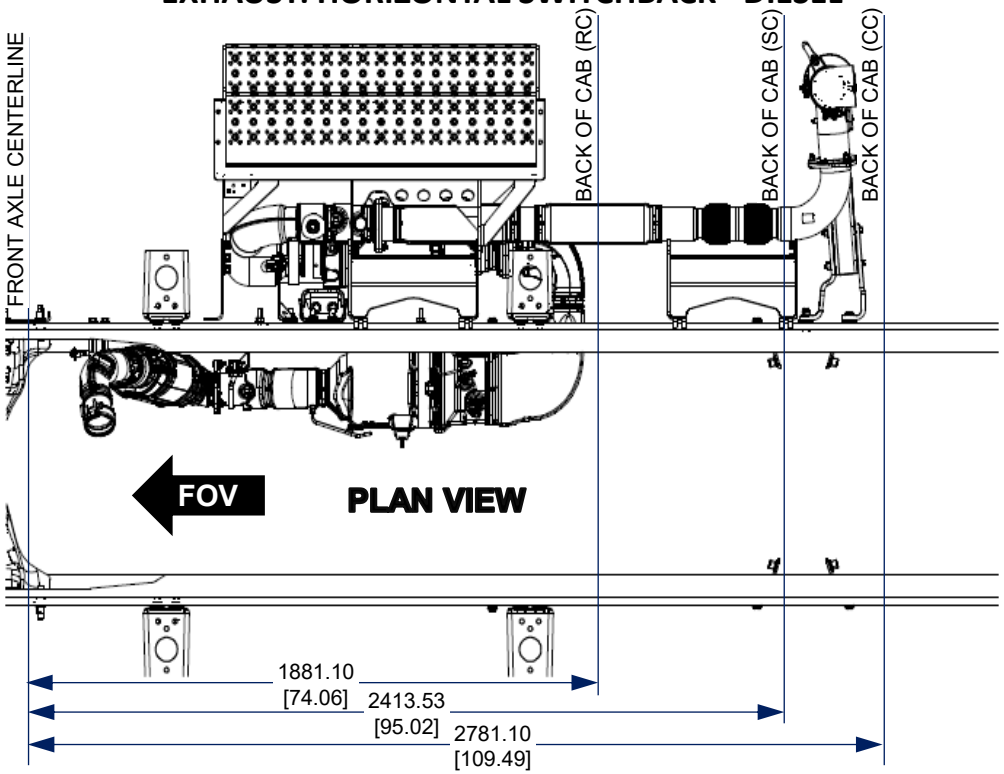
OUTSIDE FRAME RAIL DIMENSIONS

NOTE- [ ] DIMENSION ARE INCHES

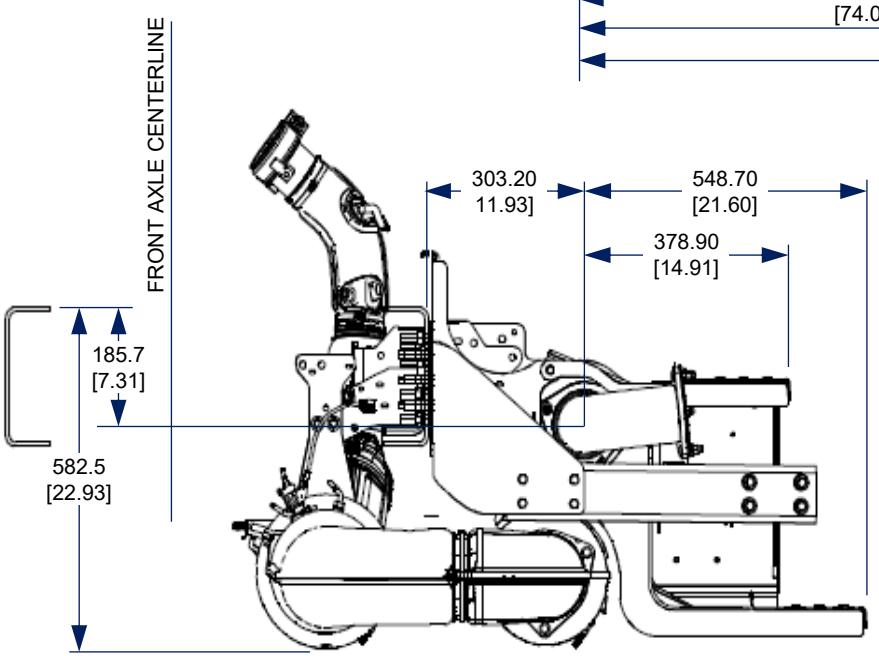
Body Builders Layout Book

MEDIUM DUTY F-650/750

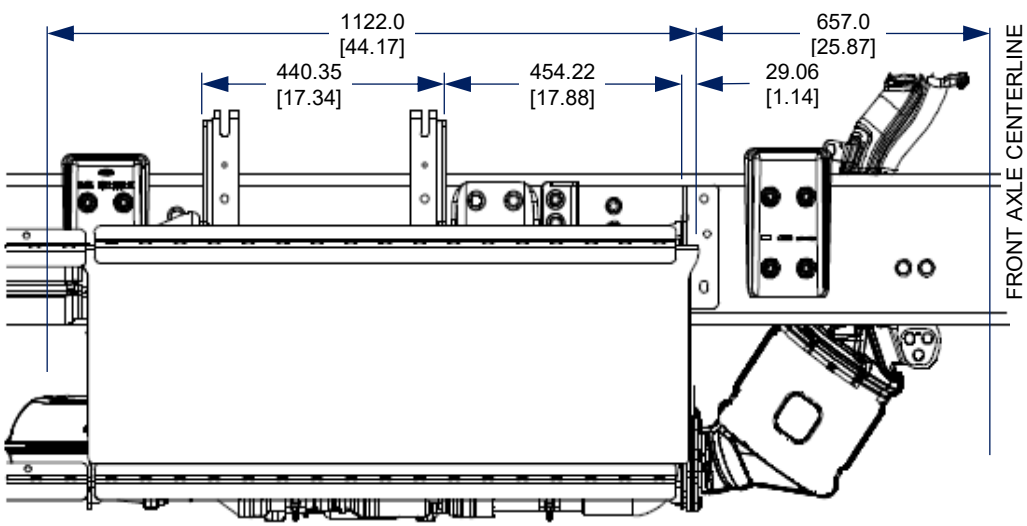
EXHAUST: HORIZONTAL SWITCHBACK - DIESEL



PLAN VIEW



REAR VIEW



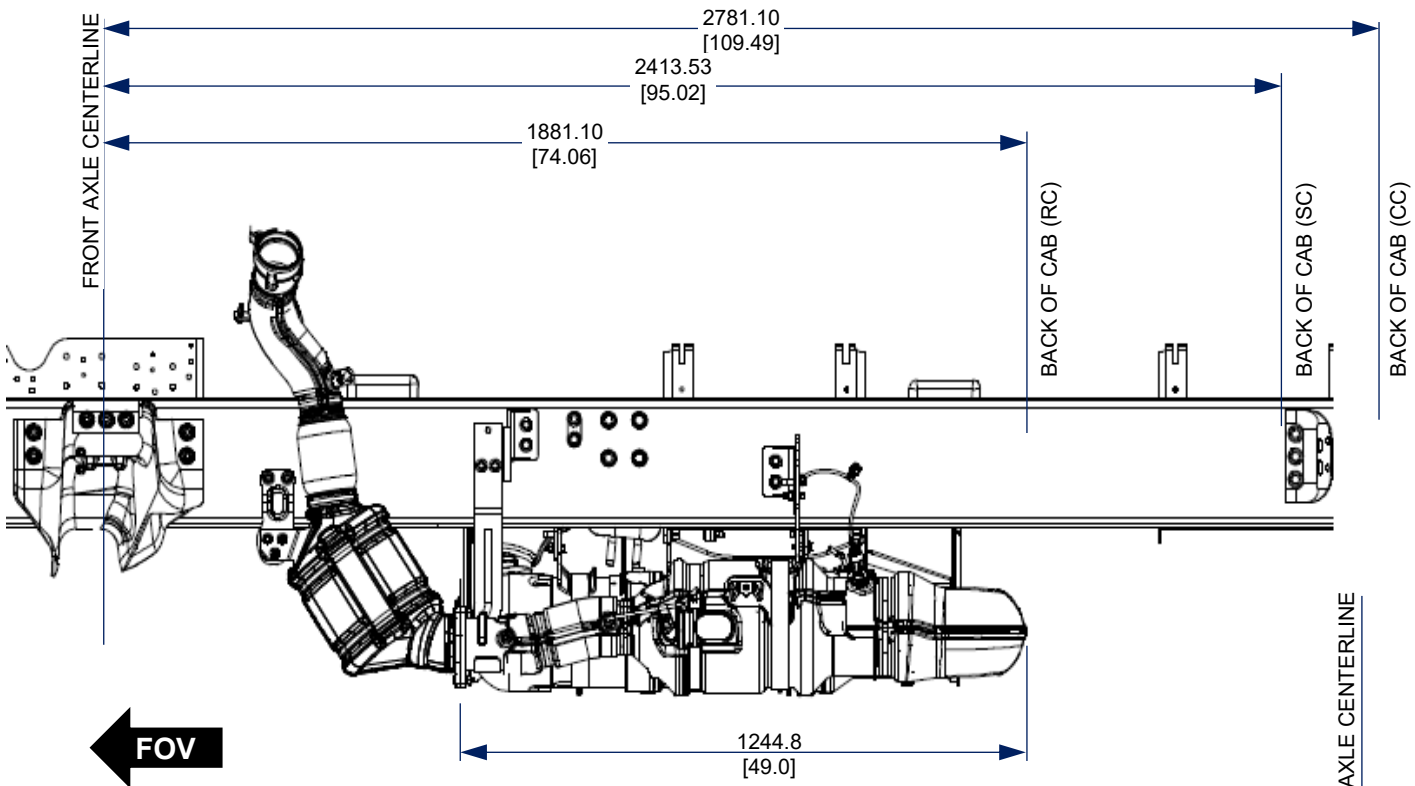
SIDE VIEW

NOTE- [ ] DIMENSION ARE INCHES

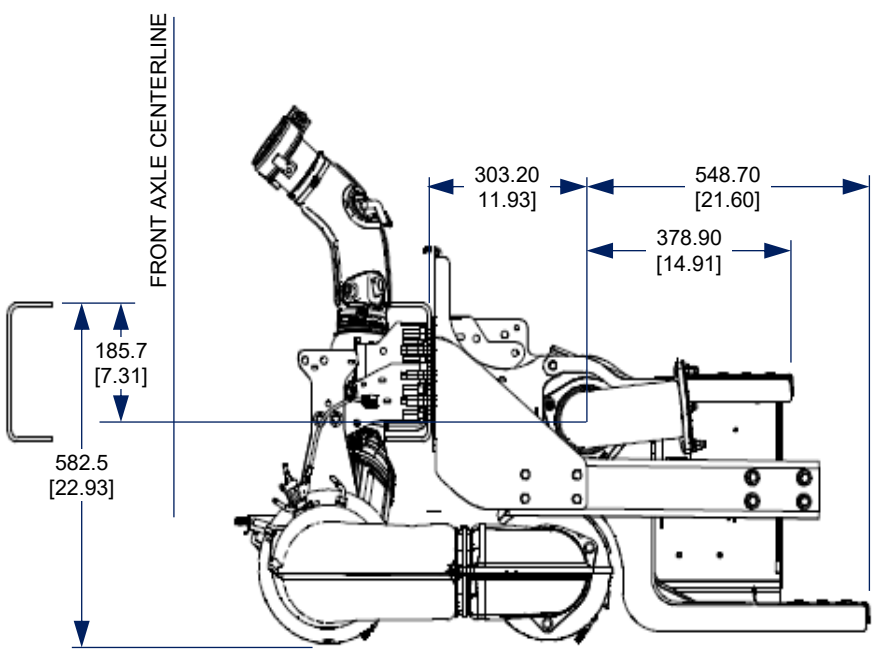
Body Builders Layout Book

MEDIUM DUTY F-650/750

EXHAUST: HORIZONTAL SWITCHBACK CREW CAB - GAS



SIDE VIEW



REAR VIEW

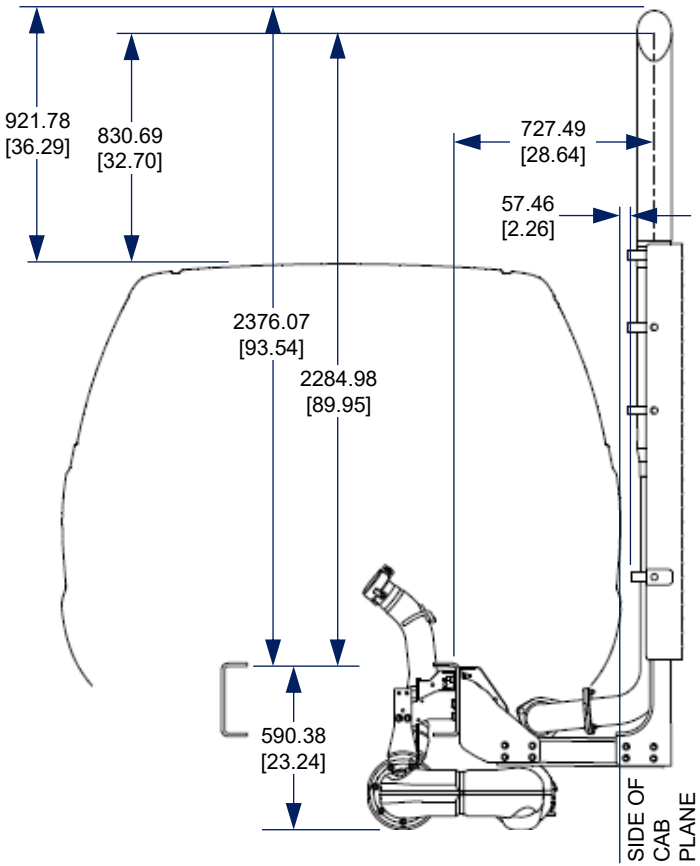
NOTE- [ ] DIMENSION ARE INCHES

Ford PRO

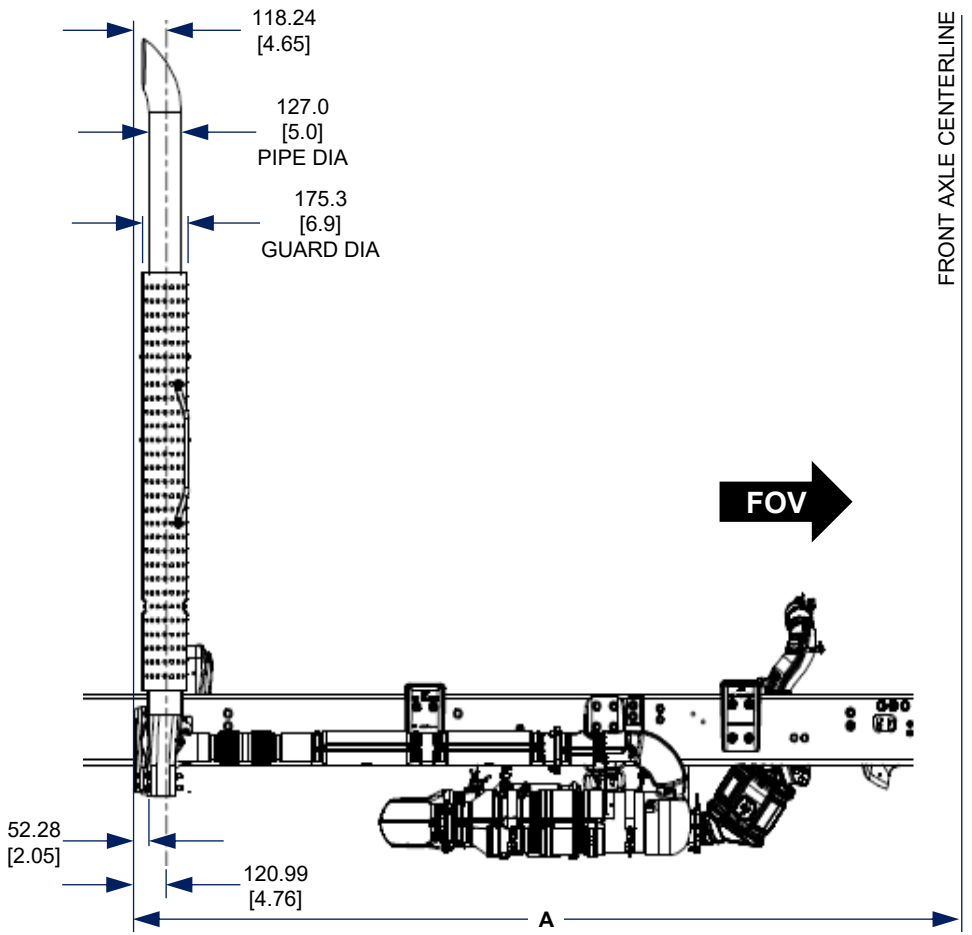
Body Builders Layout Book

MEDIUM DUTY F-650/750

EXHAUST: VERTICAL SWITCHBACK - DIESEL



REAR VIEW



SIDE VIEW

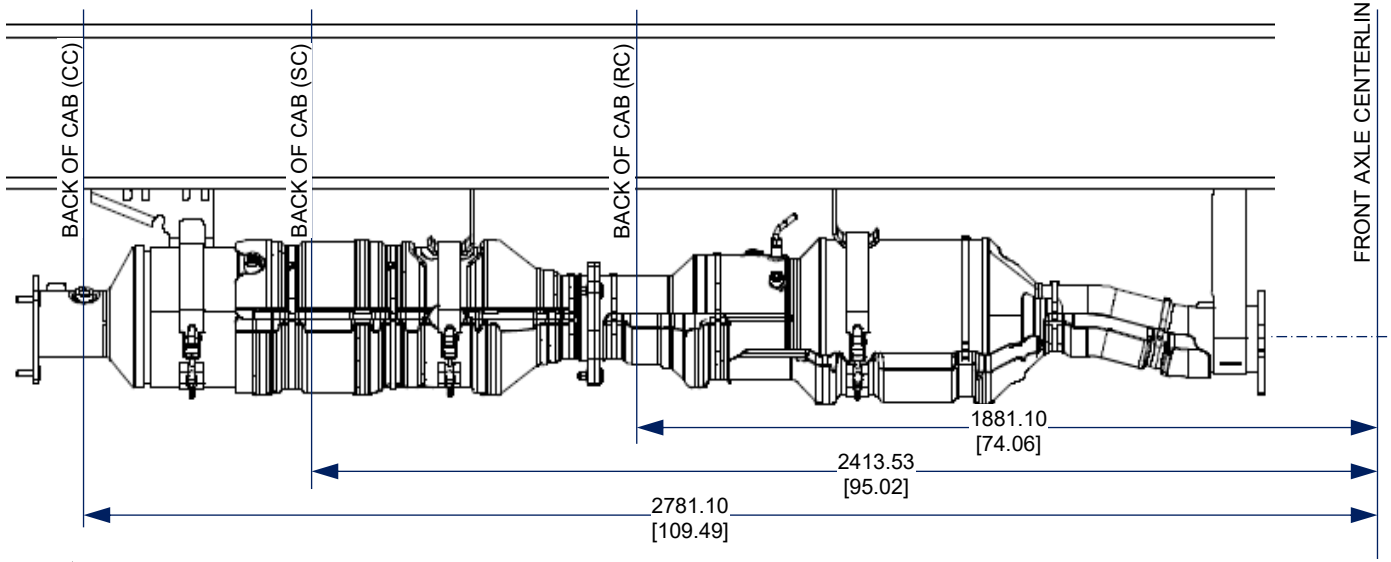
CENTERLINE OF FRONT AXLE TO REAR VERTICAL STACK BRACKET			
DIMENSION	REG CAB	SUPER CAB	CREW CAB
A	1937.44 [76.27]	2500.52 [98.44]	2836.44 [111.67]

NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

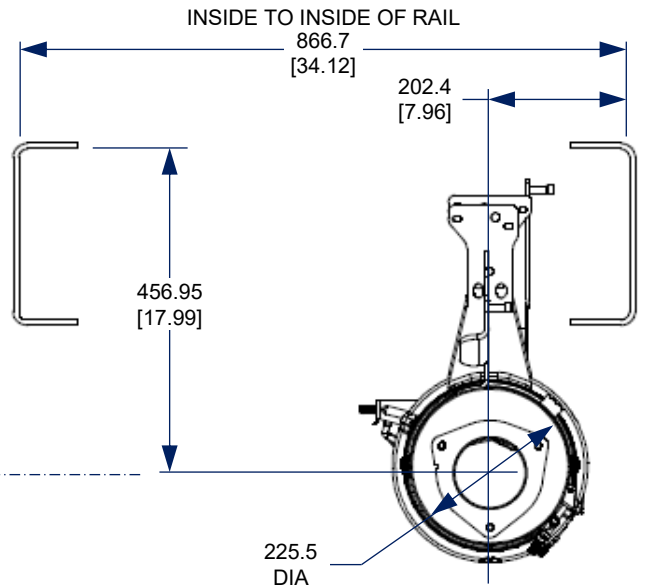
MEDIUM DUTY F-650/750

EXHAUST: INLINE - DIESEL

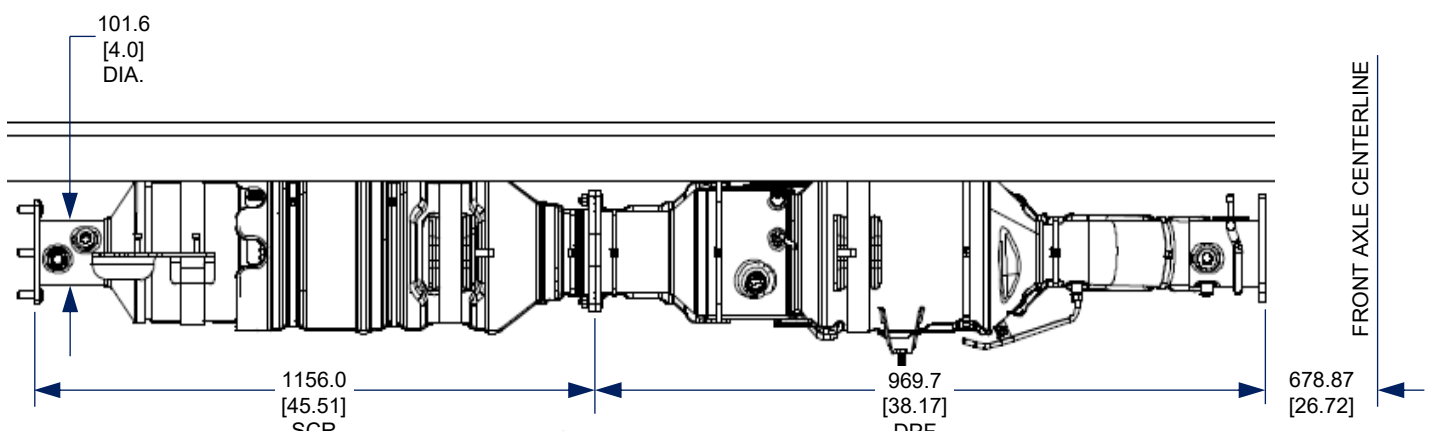


FOV

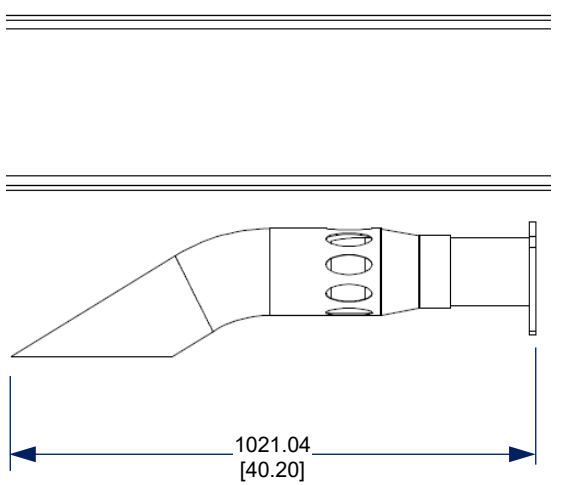
PLAN VIEW
COMMON TO ALL INLINE EXHAUST



REAR VIEW
COMMON TO ALL INLINE EXHAUST



RH SIDE VIEW
COMMON TO ALL INLINE EXHAUST



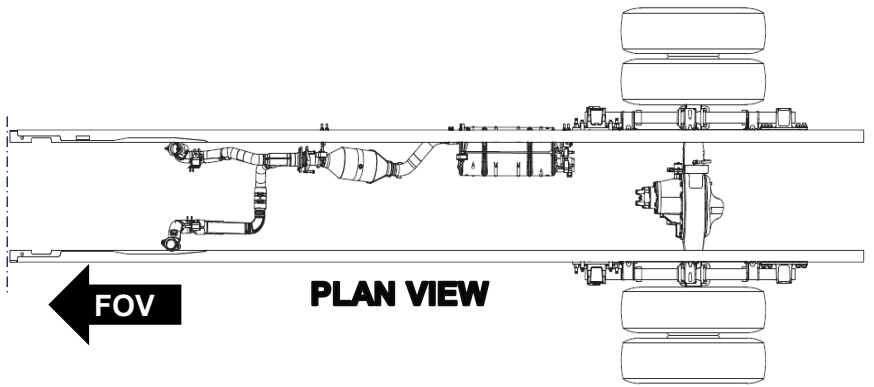
LH SIDE VIEW
RH SIDE EXIT BEFORE REAR AXLE

NOTE- [ ] DIMENSION ARE INCHES

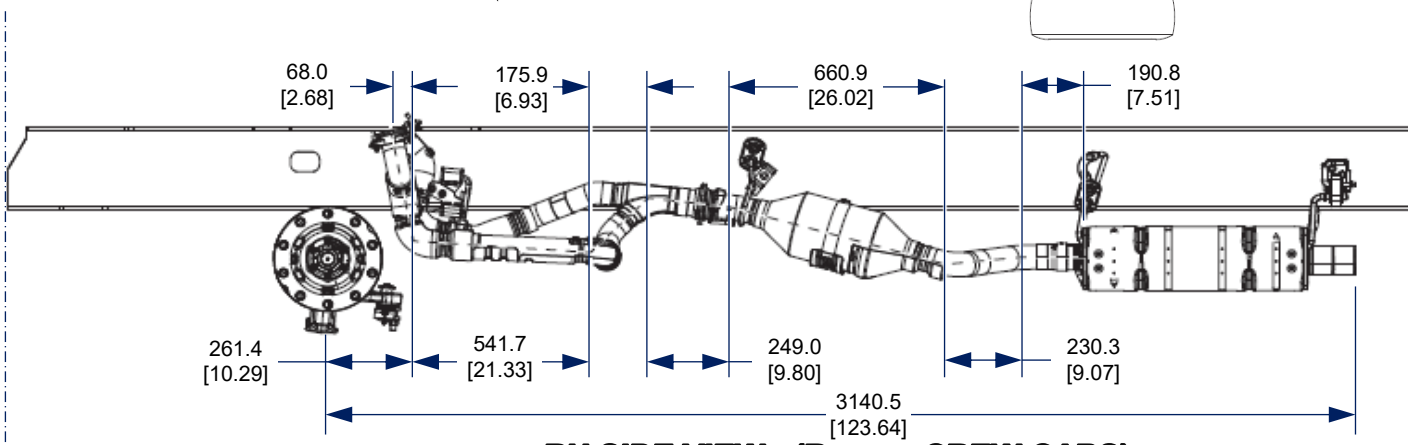
Body Builders Layout Book

MEDIUM DUTY F-650/750

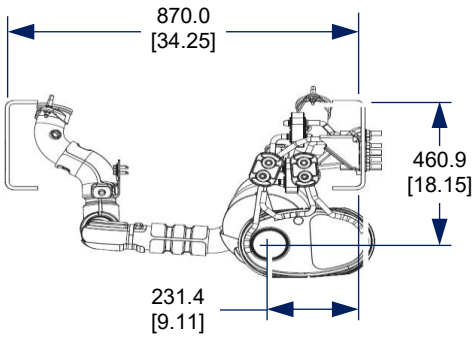
EXHAUST: HORIZONTAL INLINE REGULAR, SUPER & CREW CAB - GAS



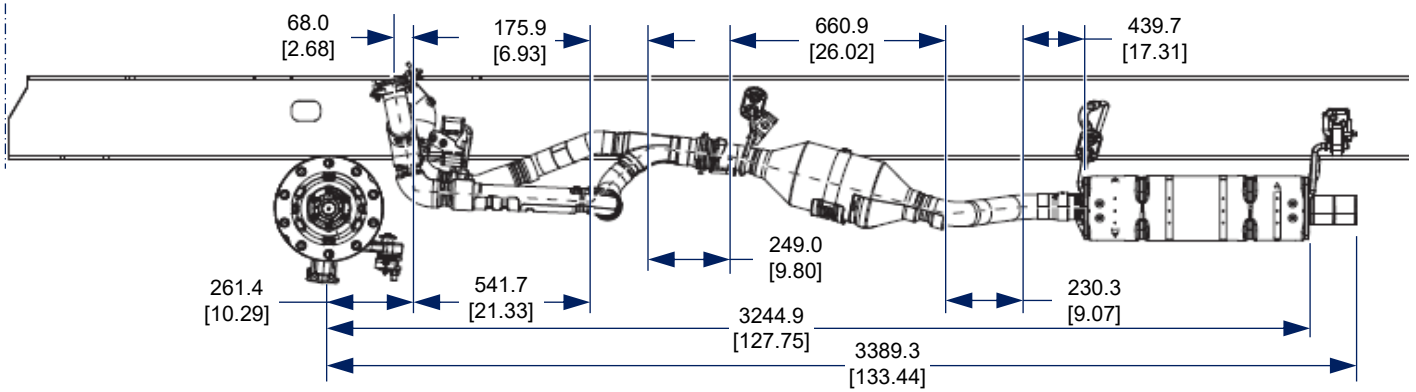
PLAN VIEW



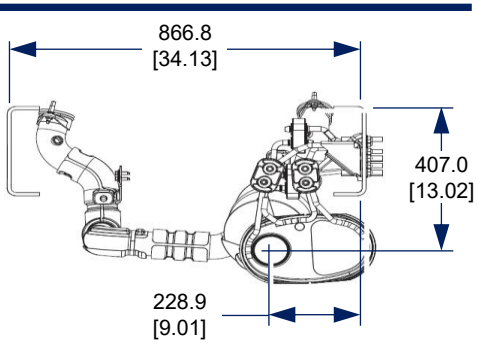
RH SIDE VIEW - (REG. & CREW CABS)
INSIDE OF PASSENGER SIDE FRAME RAIL



REAR VIEW



RH SIDE VIEW – (SUPER CAB)
INSIDE OF PASSENGER SIDE FRAME RAIL



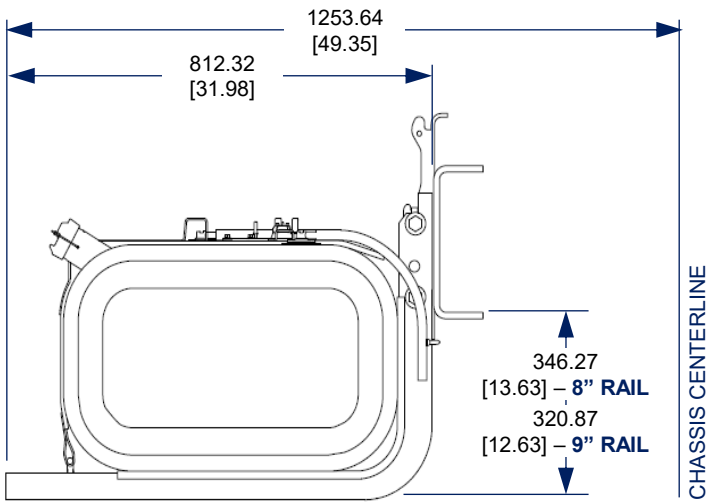
REAR VIEW

NOTE- [ ] DIMENSION ARE INCHES

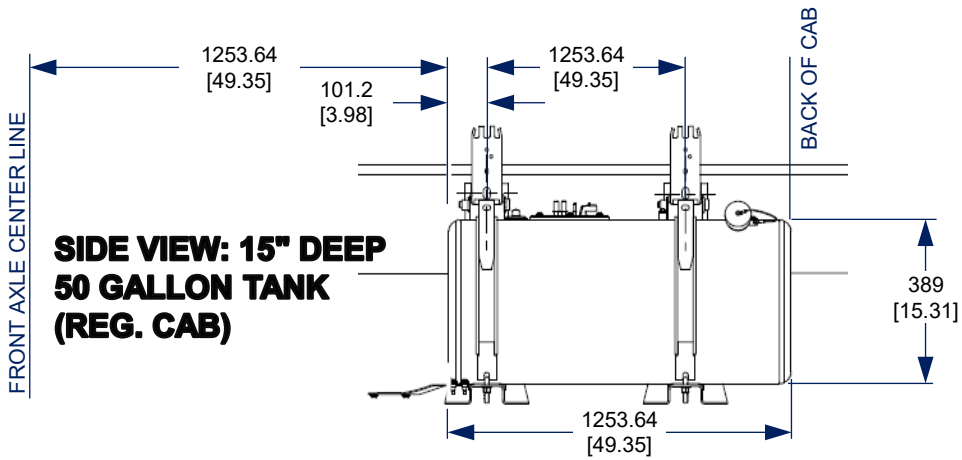
Body Builders Layout Book

MEDIUM DUTY F-650/750

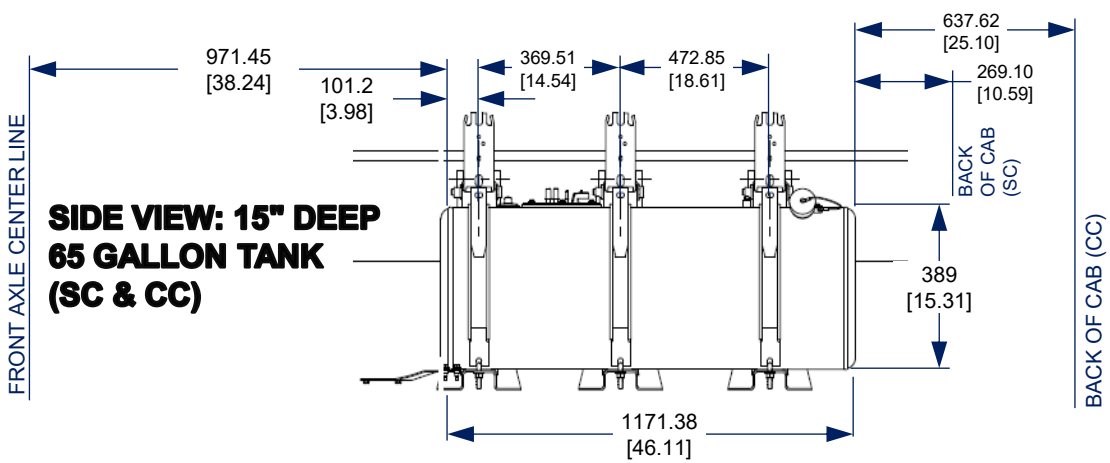
FUEL TANK LOCATIONS: LEFT SIDE MOUNTING - DIESEL



REAR VIEW: 15" DEEP 50/65 GALLON TANK



SIDE VIEW: 15" DEEP 50 GALLON TANK (REG. CAB)



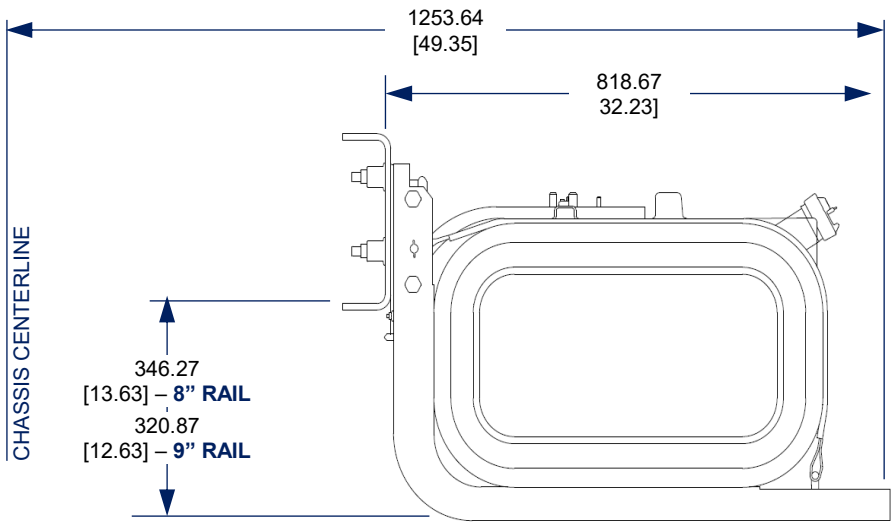
SIDE VIEW: 15" DEEP 65 GALLON TANK (SC & CC)

NOTE- [ ] DIMENSION ARE INCHES

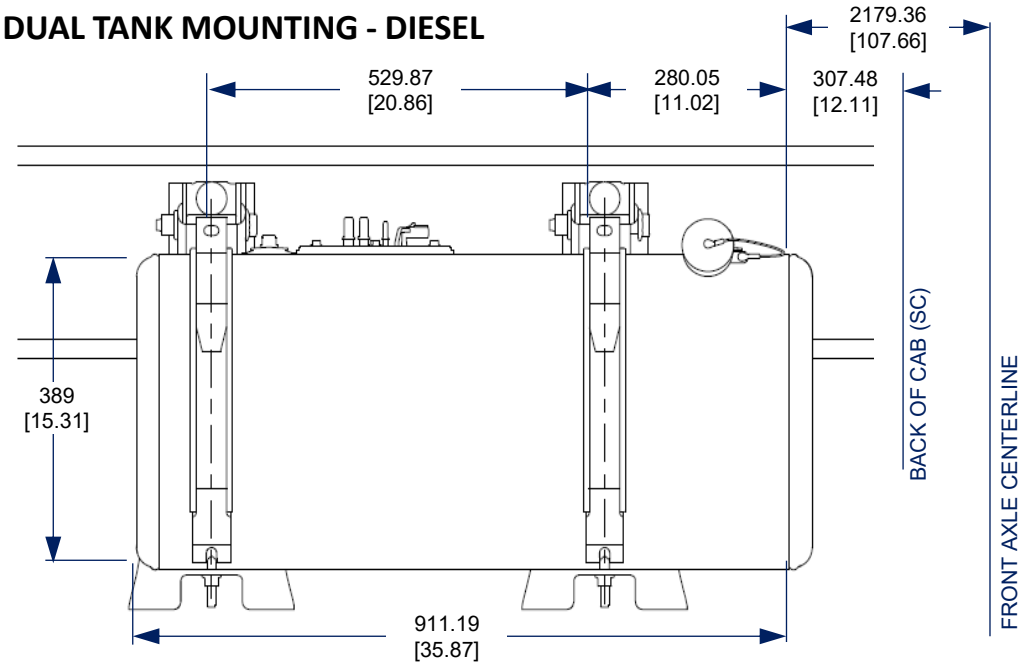
Body Builders Layout Book

MEDIUM DUTY F-650/750

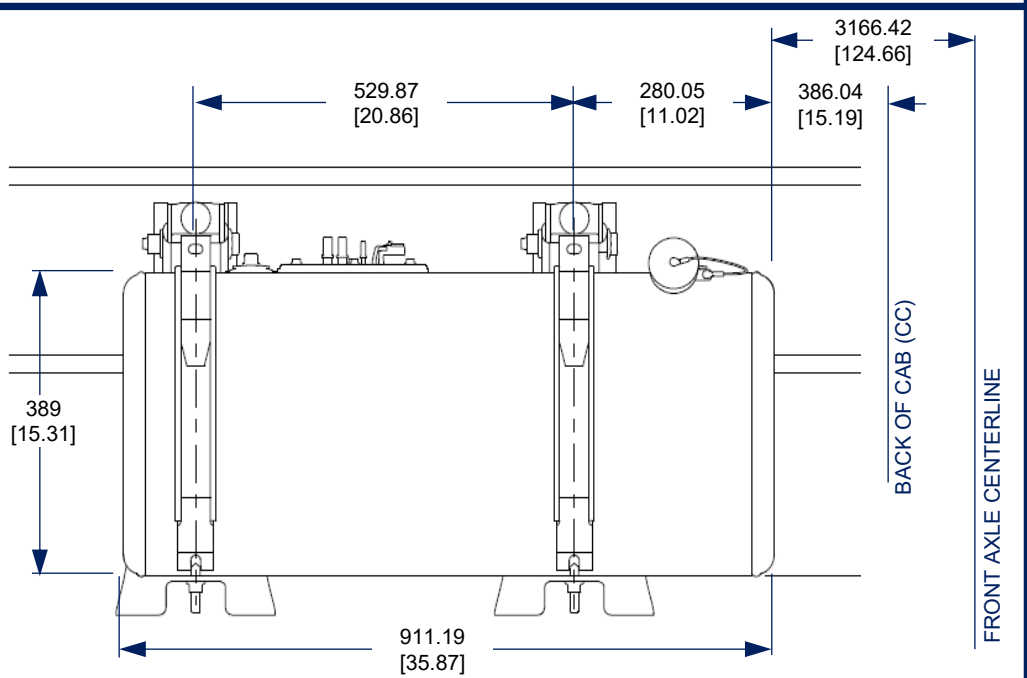
FUEL TANK LOCATIONS: RIGHT SIDE DUAL TANK MOUNTING - DIESEL



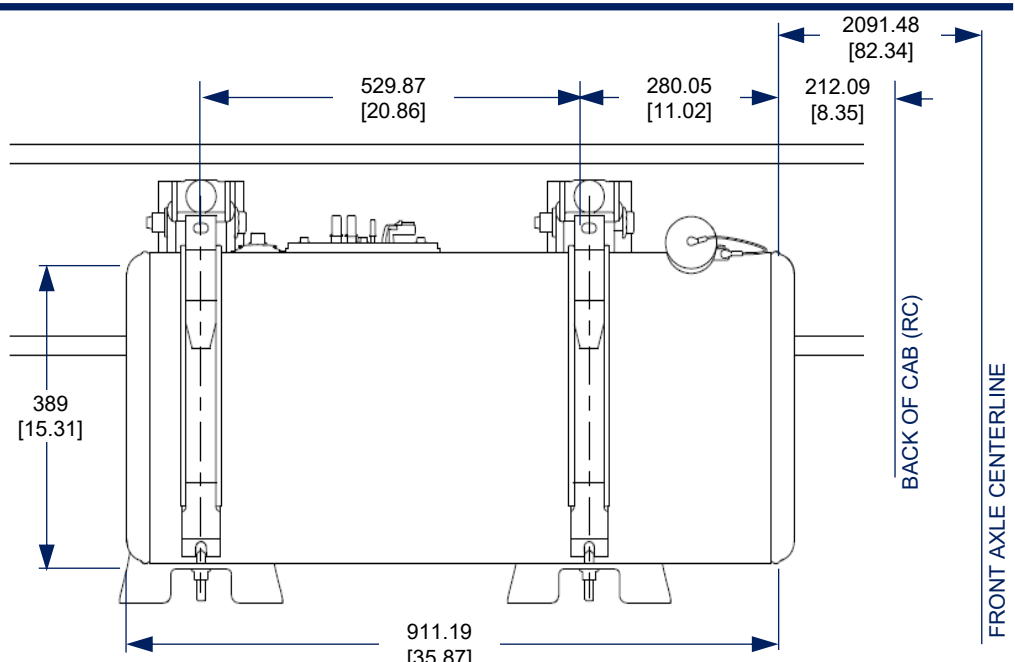
REAR VIEW: 15" DEEP 50 GALLON TANK (CC , SC & RC)



SIDE VIEW: 15" DEEP 50 GALLON TANK (SUPER CAB)



SIDE VIEW: 15" DEEP 50 GALLON TANK (CREW CAB)

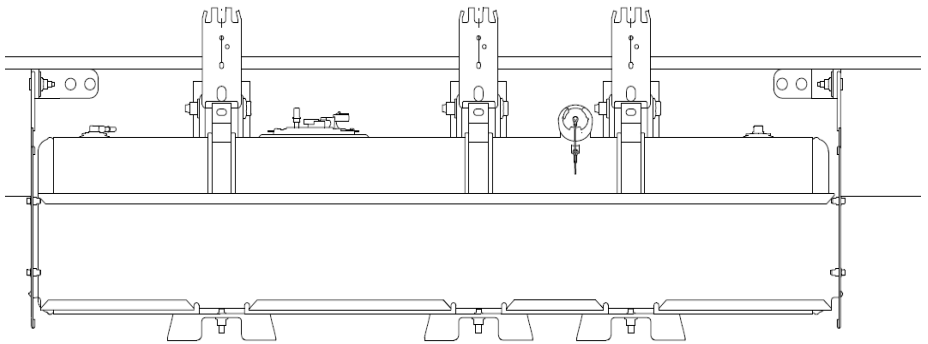


SIDE VIEW: 15" DEEP 50 GALLON TANK (REG CAB)

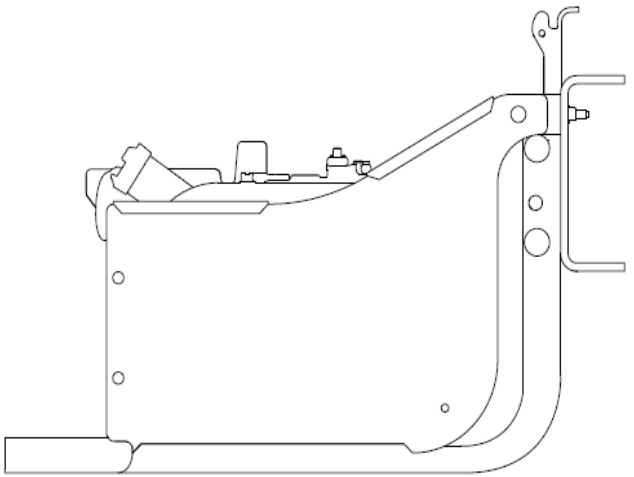
NOTE- [ ] DIMENSION ARE INCHES

MEDIUM DUTY F-650/750

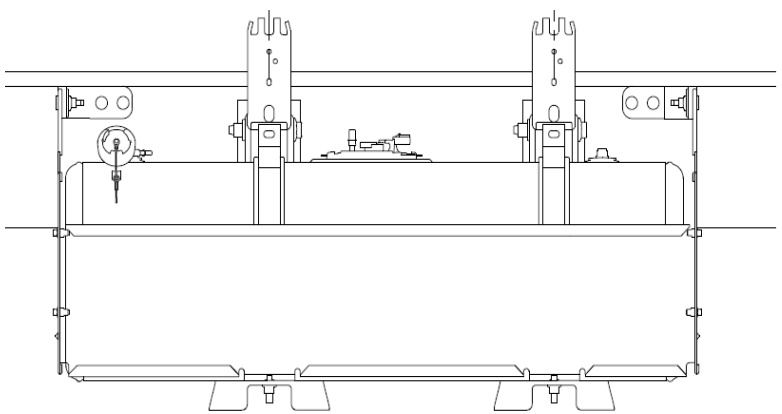
FUEL TANK LOCATIONS: LEFT SIDE MOUNTING UNDER CAB - GAS



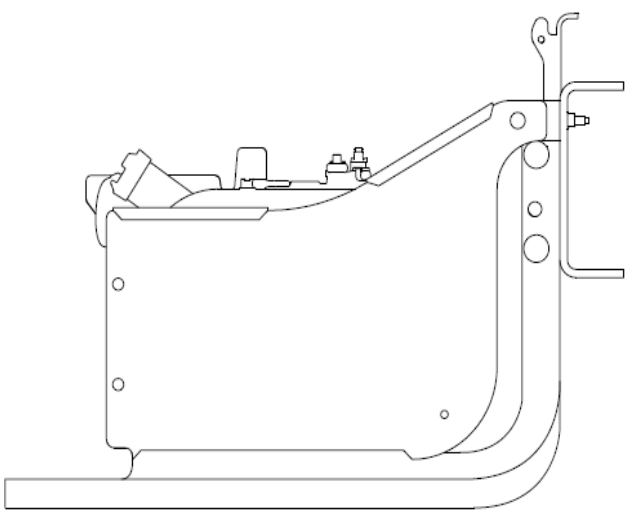
SIDE VIEW – 13" DEEP 60 GALLON TANK (REG. CAB)



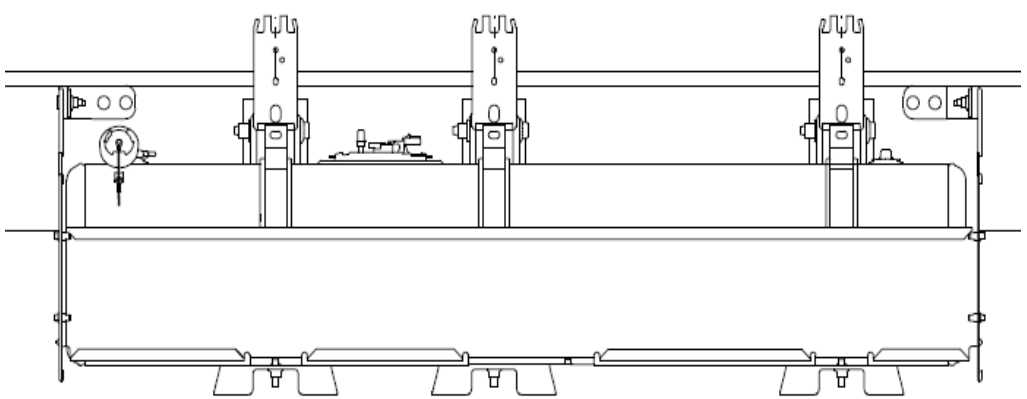
REAR VIEW – 13" DEEP 60 GALLON TANK (REG. CAB)



SIDE VIEW – 14" DEEP 50 GALLON TANK (REG. CAB)



REAR VIEW – 14" DEEP 50/60 GALLON TANK



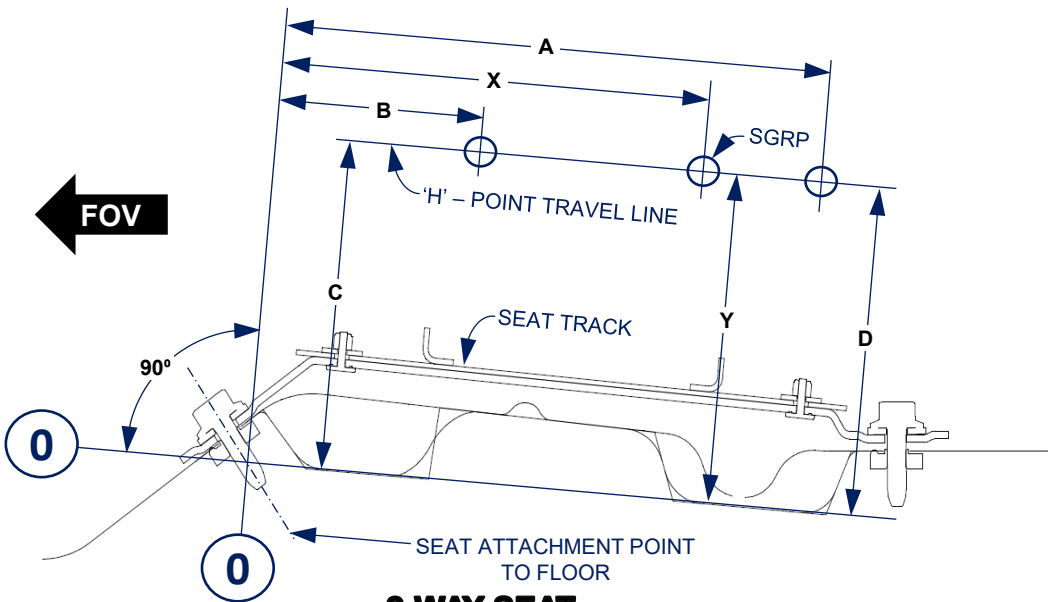
SIDE VIEW – 14" DEEP 60 GALLON TANK (SC & CC)

NOTE- [ ] DIMENSION ARE INCHES

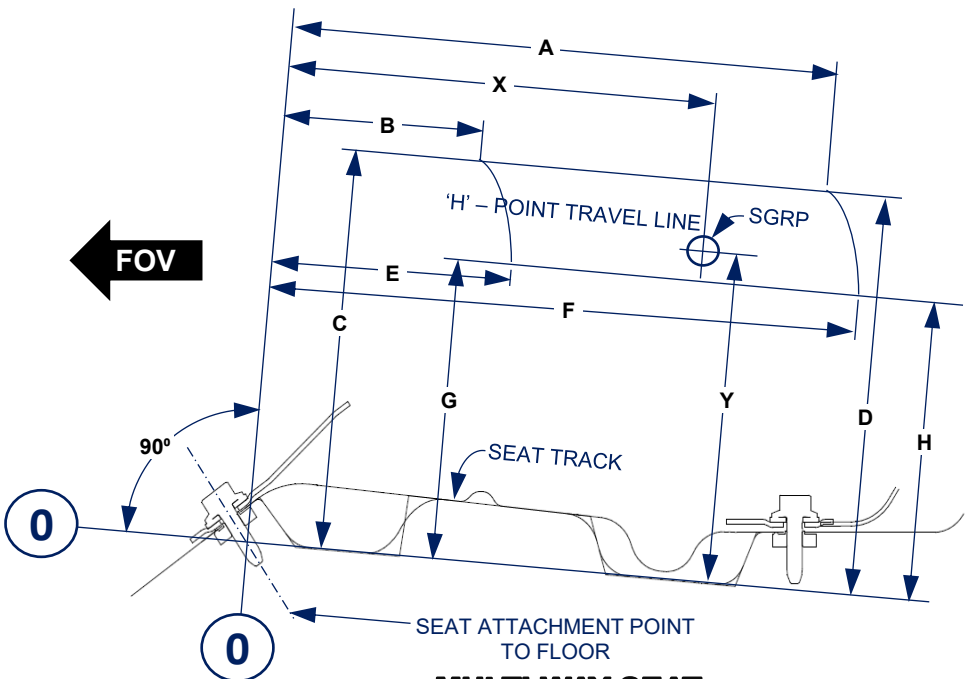
Body Builders Layout Book

MEDIUM DUTY F-650/750

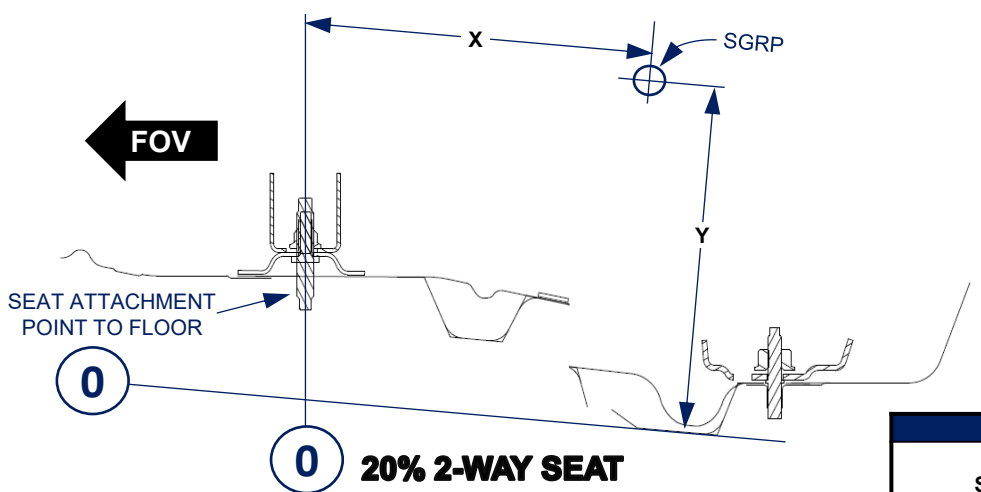
DIMENSIONAL DATA: REGULAR, SUPER & CREW SEAT - H-POINT INFORMATION



2-WAY SEAT



MULTI-WAY SEAT



20% 2-WAY SEAT

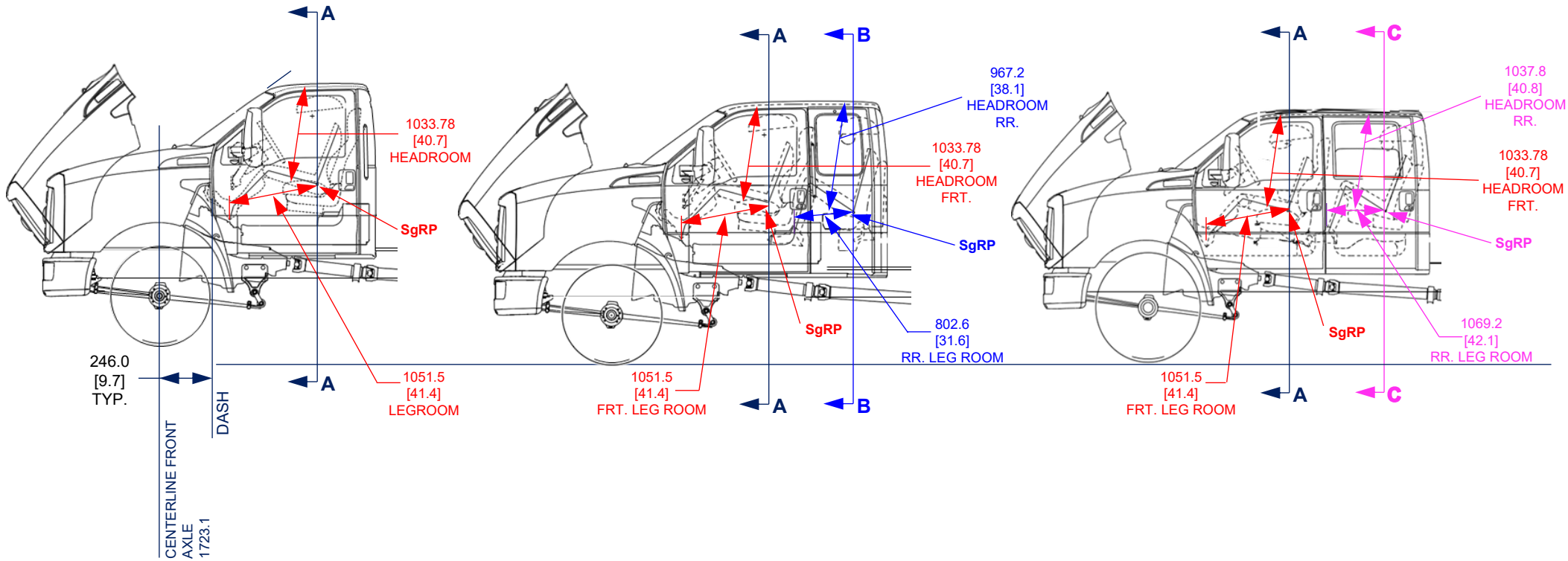
FORD F-650 & F-750 SEATING REFERENCE POINT (SRP)										
	Seat Dimensions								SgRP Location	
SEAT MODEL	A	B	C	D	E	F	G	H	X	Y
2-Way 30% Seats	278.0	125.6	327.3	327.3	-	-	-	-	278.0	327.3
4-Way 30% Seats	343.5	191.1	369.4	369.4	191.1	343.5	293.0	293.0	343.5	344.3
70% Seats	309.2	309.2	328.9	328.9	-	-	-	-	309.2	328.9
2-Way 40% Seats	334.4	132.1	329.1	337.4	-	-	-	-	272.8	334.9
20% Seats	-	-	-	-	-	-	-	-	227.4	313.5

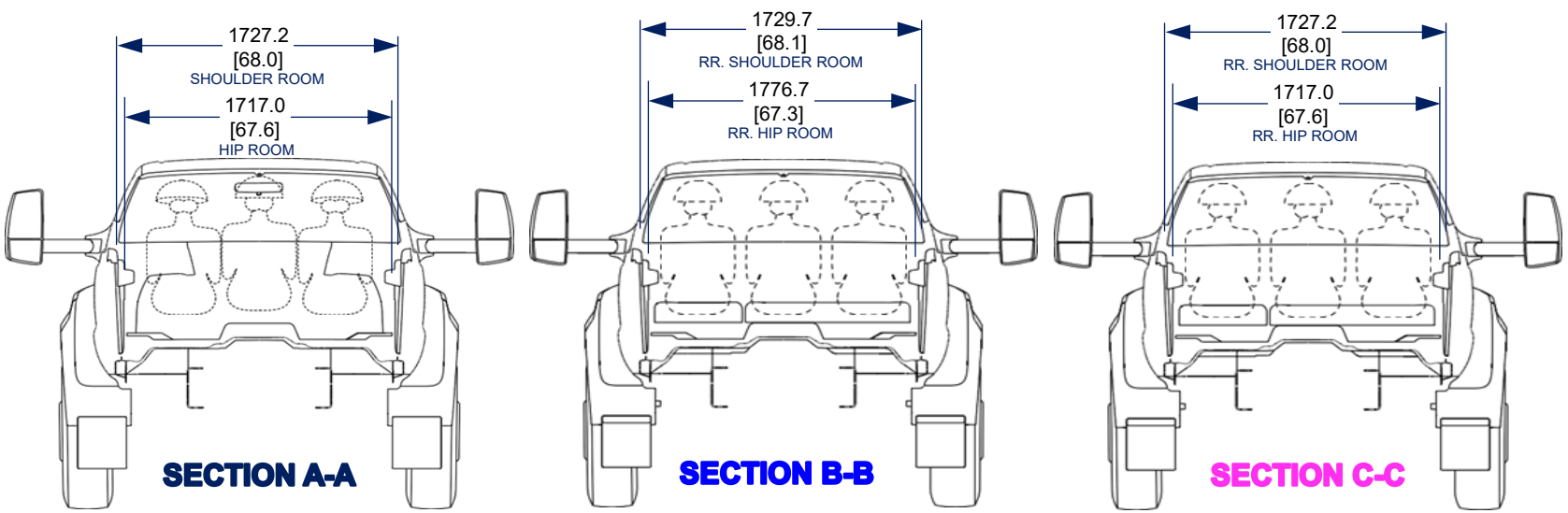
NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

MEDIUM DUTY F-650/750

DIMENSIONAL DATA: CABIN INFORMATION REGULAR, SUPER & CREW





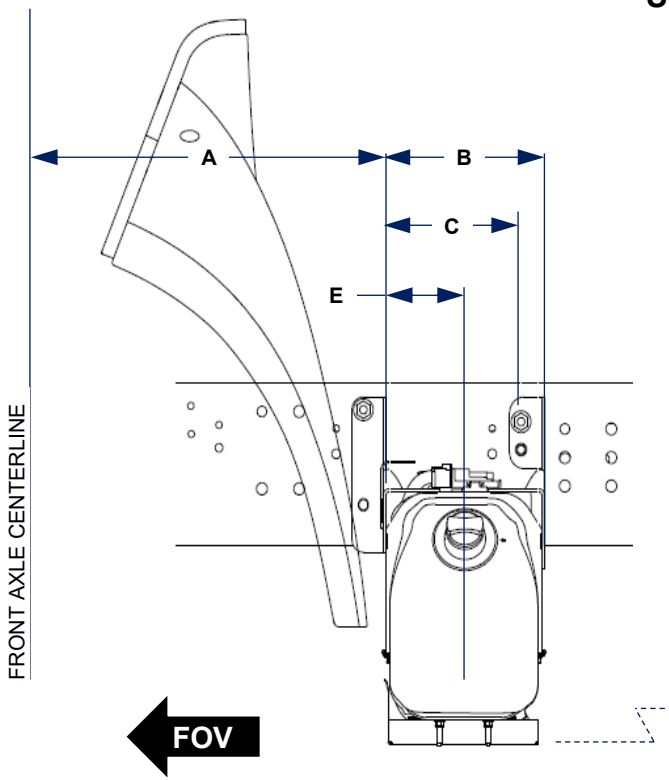
SgRP - SEATING REFERENCE POINTS				
		X	Y	Z
FRT (REG., SUP., CREW)	LH	3110.2 [122.5]	-459 [-18.1]	2063.9 [81.3]
	CTR	3084.4 [121.4]	0	2094 [82.5]
	RH	3110.2 [122.5]	459 [18.1]	2063.9 [81.3]
RR (SUP.)	LH	3839.6 [151.2]	-523 [-20.6]	2066.9 [81.4]
	CTR	3839.6 [151.2]	0	2066.9 [81.4]
	RH	3839.6 [151.2]	523 [20.6]	2066.9 [81.4]
RR (CREW)	LH	4078.1 [160.6]	-479 [-18.9]	2063.9 [81.3]
	CTR	4078.1 [160.6]	0	2063.9 [81.3]
	RH	4078.1 [160.6]	479 [18.9]	2063.9 [81.3]

NOTE- [ ] DIMENSION ARE INCHES

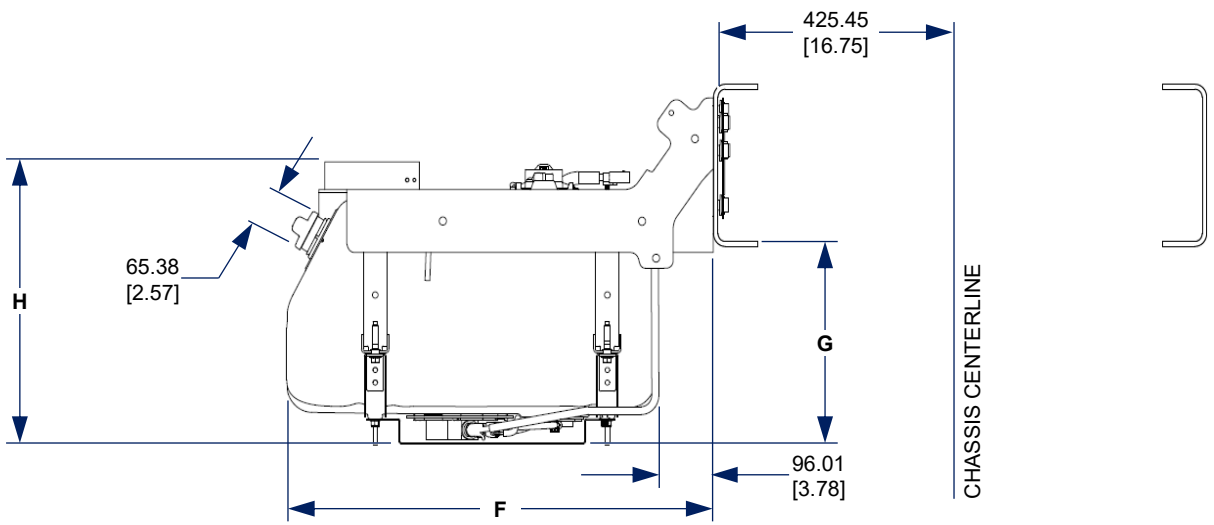
Body Builders Layout Book

MEDIUM DUTY F-650/750

UREA TANK LOCATION: UREA EXHAUST - DIESEL



SIDE VIEW



REAR VIEW

DEF (UREA) TANK DIMENSION DESCRIPTION	DIMENSION	VIEW(S)	ALL CAB
DEF TANK CAPACITY(FUEL TANK DEPTH) / MOUNTING SIDE			8 Gal/ R SM
FRONT AXLE CL TO FORWARD FACE OF TANK / BOX	A	Top	684.6 / 27"
WIDTH OF TANK / BOX	B	L	259.0 / 10.2"
FORWARD FACE TO CL FRAME HOLE	C	L	229.5 / 9.0"
CL BRACKET (FRAME HOLE) TO BRACKET (FRAME HOLE)	D	Rear	275.6 / 10.9"
FORWARD FACE TO FILL NECK CL	E	Top	129.5 / 5.1"
O/S FRAME TO O/S TANK / BOX	F	Rear	748.2 / 29.5"
1000 TO BOTTOM OF TANK / BOX	G	Rear	For 8.5 in Deep Frame 345.8 / 13.6" For 9.5 in Deep Frame 320.4 / 12.6"
BOTTOM OF TANK / BOX TO TOP OF TANK / BOX	H	Rear	446.4 / 17.6"

CAUTION: FORD MOTOR COMPANY DOES NOT APPROVE OF RELOCATING ANY COMPONENTS OF THE DIESEL EXHAUST FLUID (DEF) SYSTEM AND/OR THE EXHAUST SYSTEM

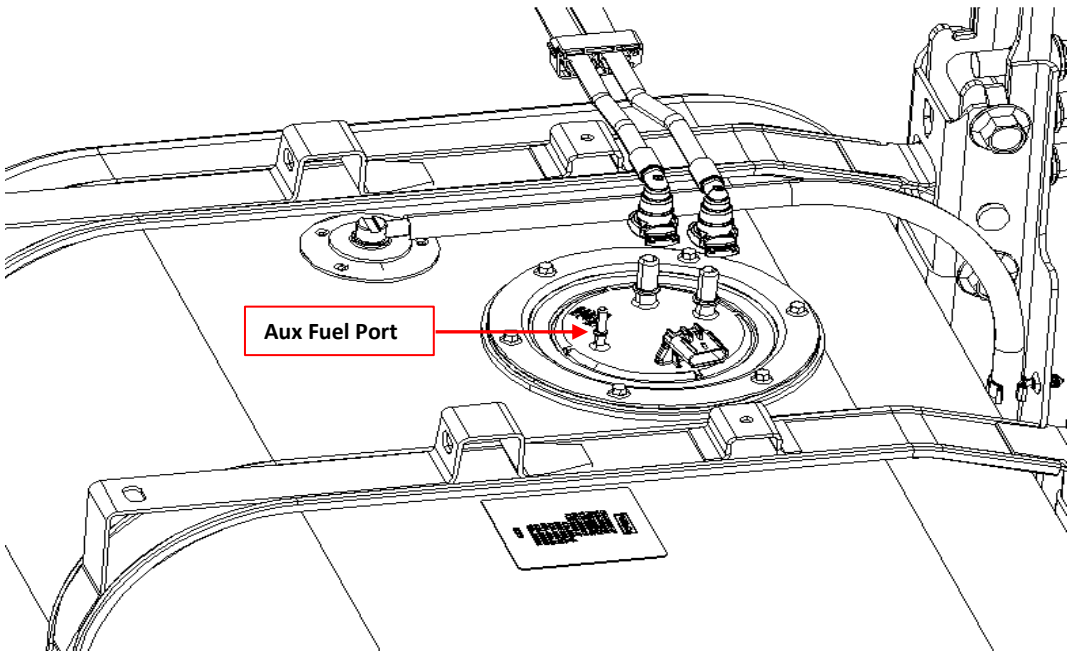
NOTE- [ ] DIMENSION ARE INCHES

Body Builders Layout Book

MEDIUM DUTY F-650/750

AUX FUEL / CLIMATE CONTROL

All Super-Duty F-650 and F-750 come equipped with an Auxiliary Fuel Port located in the fuel sender unit on the top of the fuel tank. These Aux Fuel Ports can provide a fuel supply to upfitter-installed equipment such as generators.



Fuel System – Aux Fuel Port Connector Kit

To use the auxiliary fuel port on the F-650 F-750 Chassis Cab fuel tank, a service kit can be obtained from your local Ford dealership parts department.
-Aux Fuel Port Service Kit Number: **9C2Z-9B210-A**

The kit includes a quick connector, a clamp and tag.
Install this kit to allow installed equipment (such as a generator) to use fuel from the vehicle fuel tank.

*Please reference the appropriate Ford workshop manual for information regarding the fuel system.

Note: No Return Fuel port provision are available on these models due to fuel tank configuration

Model	Fuel Tank Capacity*		
	50 gal	60 gal	65 gal
	Remaining Fuel Volume (Gallons) at Auxiliary FuelTube Shut-off		
Gas	8	10	--
Diesel	9	--	11.5

* Fuel volumes are estimated

CLIMATE CONTROL: GREEN HOUSE GAS EVAPORTIVE EMISSIONS

For vehicles without an incomplete system option (vehicle is shipped with refrigerant including prep packages)

Pursuant to California regulation 17 CCR §95663, the specific leakage for this vehicle (as built by Ford Motor Company) is shown in the table below (see "J2727 Leakage Value" column). If the vehicle air conditioning system is modified in any way, or air conditioning systems are added, the intermediate or final-stage manufacturer must calculate the final system leakage. If desired, the spreadsheet used by Ford to calculate the J2727 Leakage is available and can be edited to reflect the modified system. Please contact Ford BBAS to request a copy of the vehicle line specific GHG Evaporative Emissions Worksheet: https://www.fordpro.com/en-us/upfit/bbas/com

MY	VEHICLE LINE	FEATURES / MODELS	EVAPORATOR	ENGINE	REFRIGERANT	CHARGE SIZE OF A/C SYSTEM (KG)	J2727 LEAKAGE VALUE (G/YR)	MAX ALLOWED LEAKAGE
2026	MED TRUCK	F-650/750	SINGLE	7.3L GAS	R-134a	0.750	8.495	11.250
2026	MED TRUCK	F-650/750	SINGLE	6.7L DIESEL	R-134a	0.751	6.657	11.265

VEHICLE IS SHIPPED WITH REFRIGERANT INCLUDING PREP PACKAGES

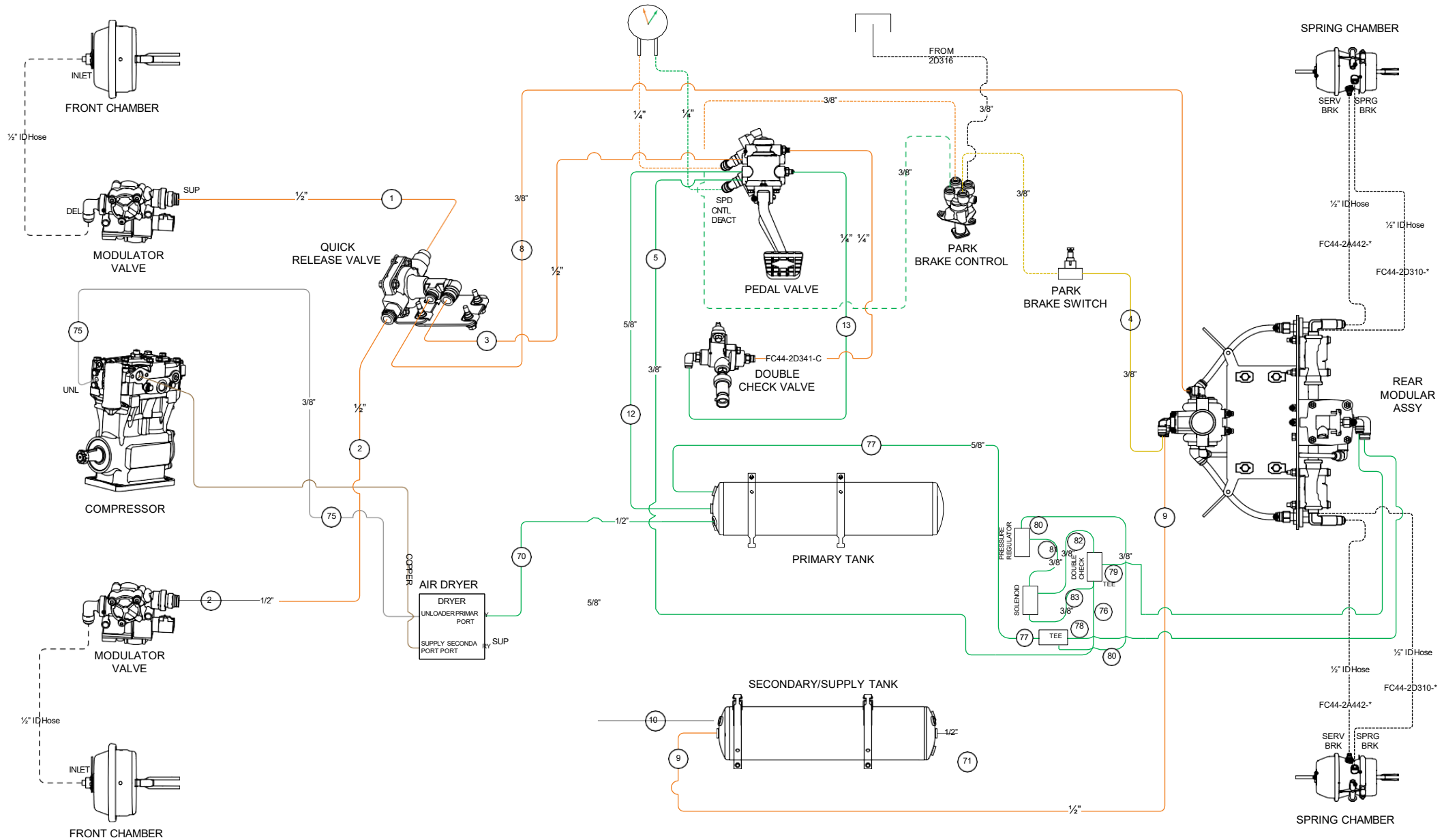
NOTE- [ ] DIMENSION ARE INCHES

Ford PRO

Body Builders Layout Book

MEDIUM DUTY F-650/750

BRAKE SYSTEMS: STRAIGHT TRUCK AIR BRAKE SCHEMATIC REG CAB W/AIR DRYER

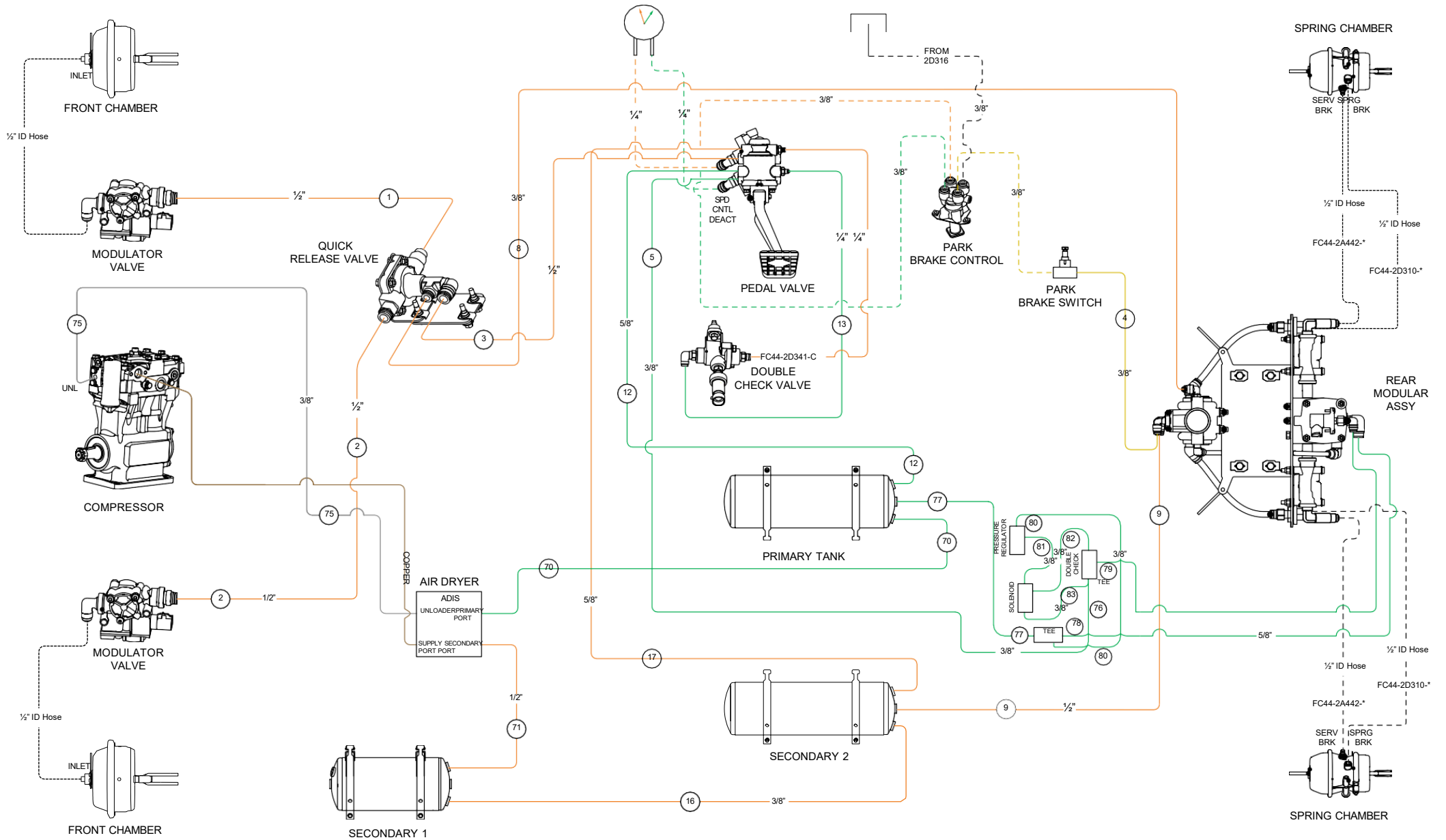


Ford PRO

Body Builders Layout Book

MEDIUM DUTY F-650/750

BRAKE SYSTEMS: STRAIGHT TRUCK AIR BRAKE SCHEMATIC SUPER & CREW CAB W/AIR DRYER

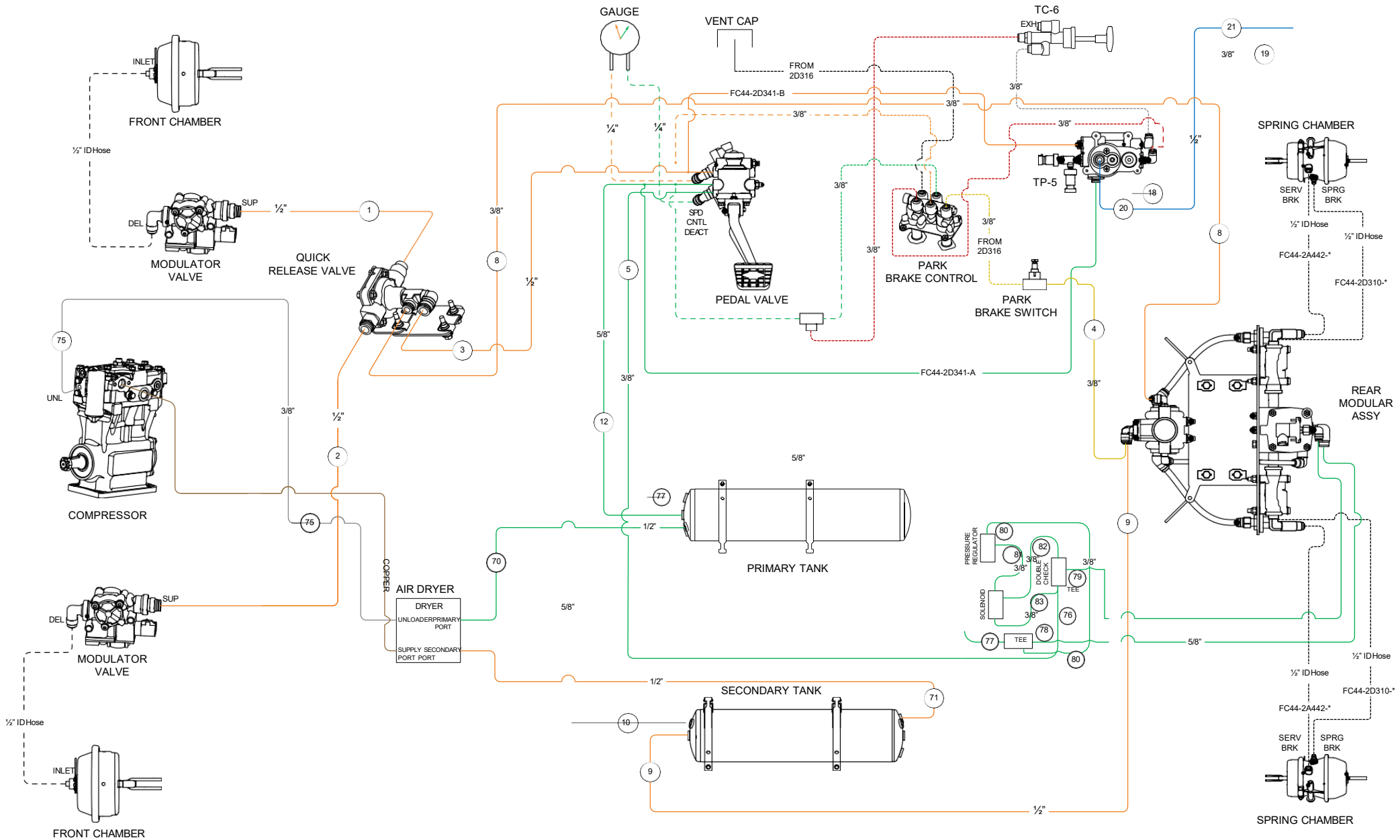


Ford PRO

Body Builders Layout Book

MEDIUM DUTY F-650/750

BRAKE SYSTEMS: STRAIGHT TRUCK W/TRAILER TOW AIR BRAKE SCHEMATIC REG. CAB W/ AIR DRYER

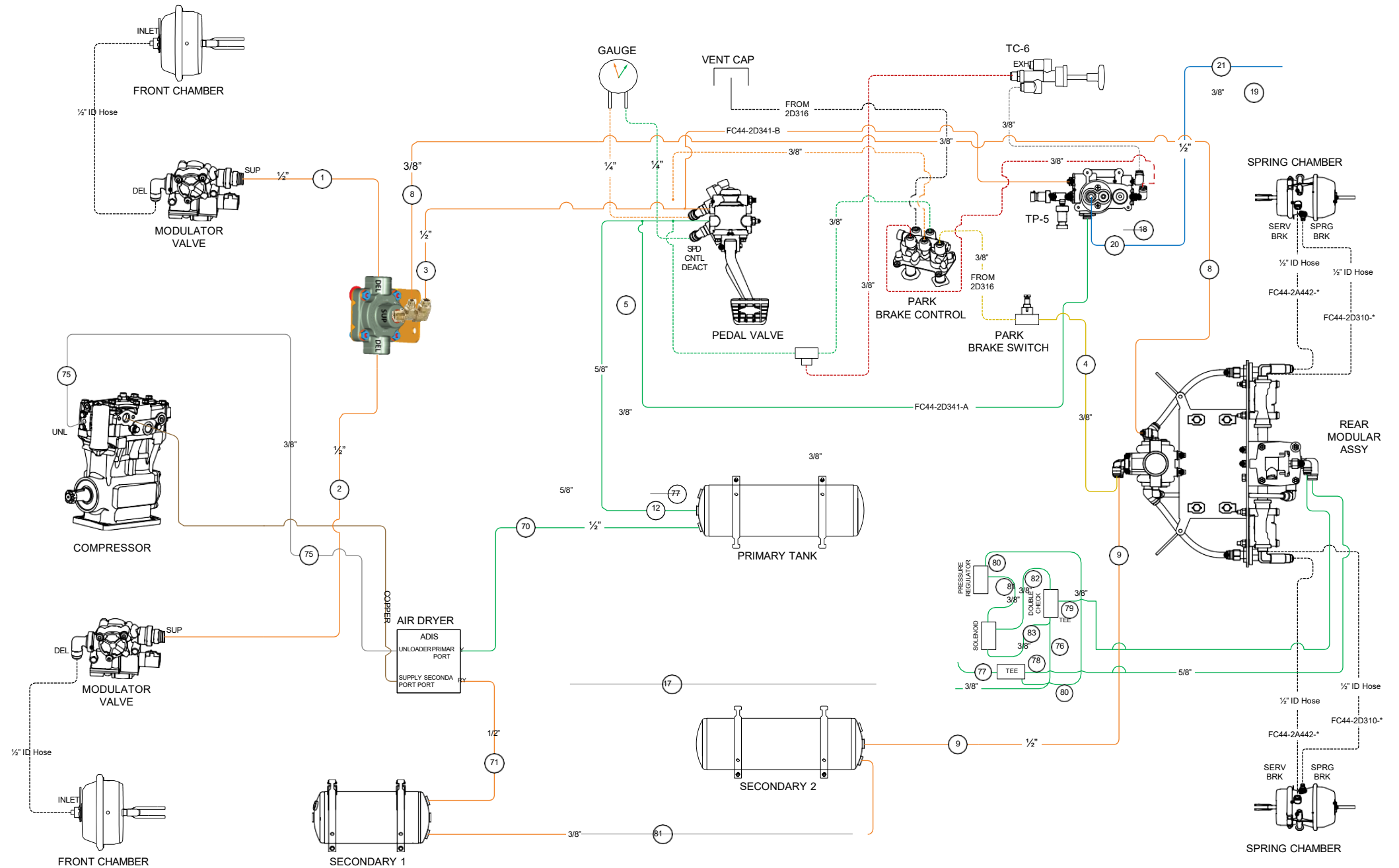


Ford PRO

Body Builders Layout Book

MEDIUM DUTY F-650/750

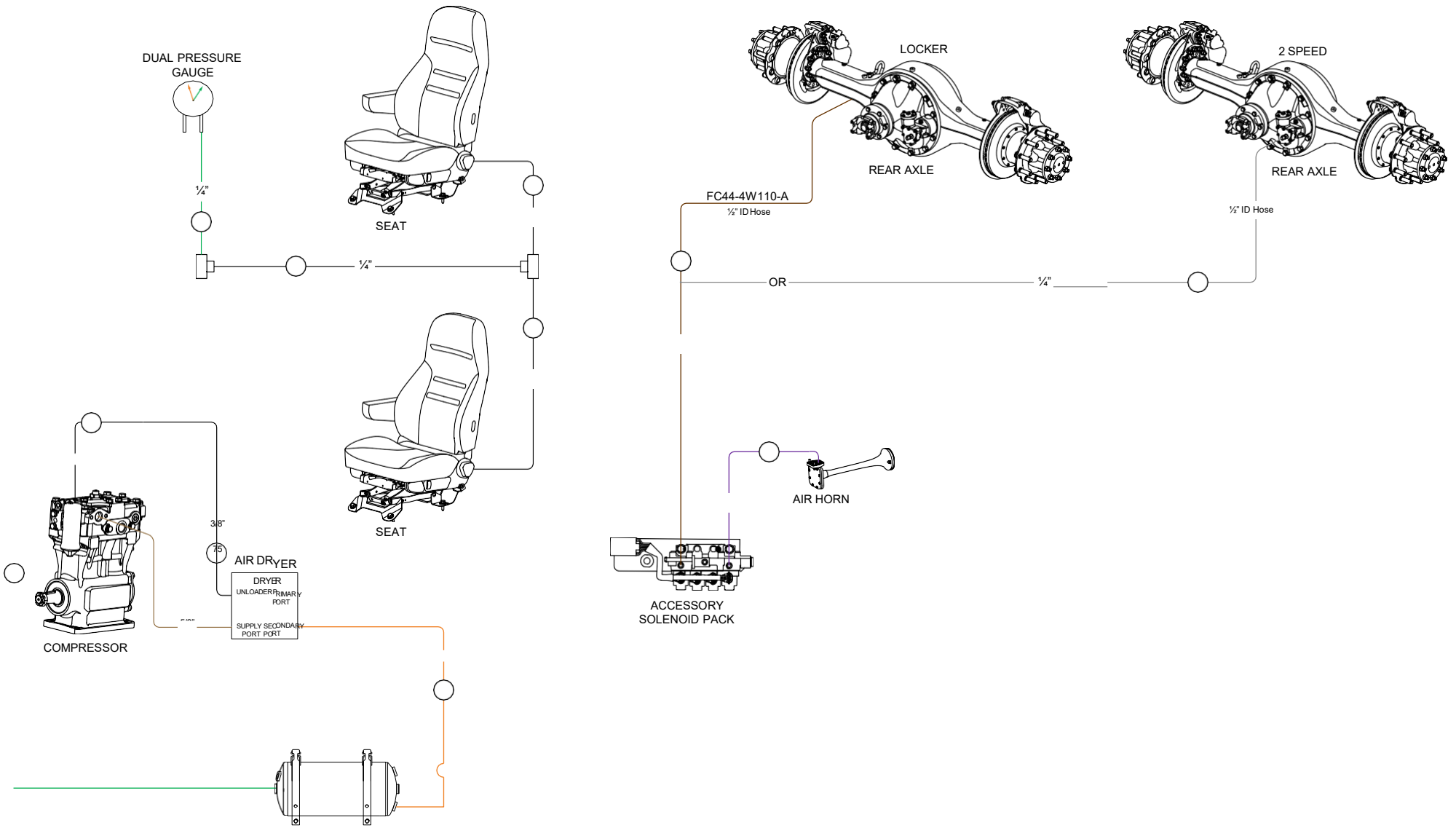
BRAKE SYSTEMS: STRAIGHT TRUCK W/TRAILER TOW AIR BRAKE SCHEMATIC SUPER & CREW CAB W/ AIR DRYER



Body Builders Layout Book

MEDIUM DUTY F-650/750

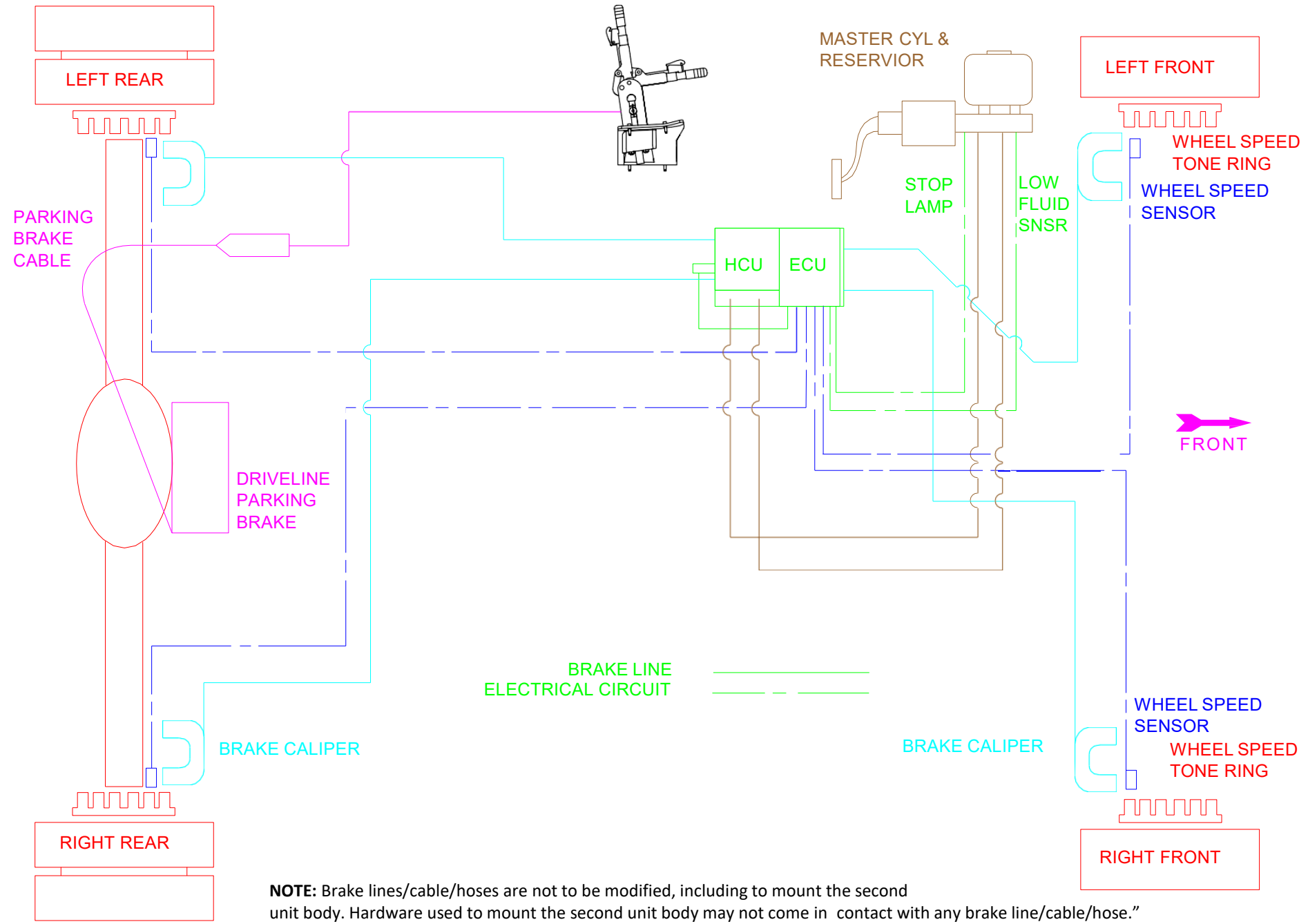
AIR ACCESSORIES SCHEMATIC W/AIR DRYER COMPRESSOR



Body Builders Layout Book

MEDIUM DUTY F-650/750

BRAKE SYSTEMS: HYDRAULIC BRAKE SYSTEM SCHEMATIC



NOTE: Brake lines/cable/hoses are not to be modified, including to mount the second unit body. Hardware used to mount the second unit body may not come in contact with any brake line/cable/hose."

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Body Builders Layout Book

MEDIUM DUTY F-650/750

FORD CO-PILOT360™ TECHNOLOGY

Ford Co-Pilot360™
Ford Co-Pilot360 is a collection of advanced driver-assist (ADAS) features designed to help drivers feel confident and in command on the road. These smart features can help drivers be more aware of their surroundings, provide alerts about surprises on the road and help to avoid potential collisions while navigating the road ahead.

Forward facing ADAS features are enabled by either a windshield mounted camera, or a combination of camera and bumper mounted radar module

F-650 and F-750 Chassis Cabs have neither windshield mounted camera nor bumper mounted radar unless one of the following optional packages is selected:

- **Driver-Assist Technology Package for *Hydraulic Brakes* (Order code 87H) includes a windshield mounted camera**
- **The Driver-Assist Technology Package for *Air Brakes* (Order code 87A) includes both windshield mounted camera and bumper mounted radar.**

Installed upfitter equipment should not infringe on the radar or camera view zones. The CAD files of the radar and camera view zones are available upon request via the Ford BBAS web site
https://www.fordpro.com/en-us/upfit/contact-us/

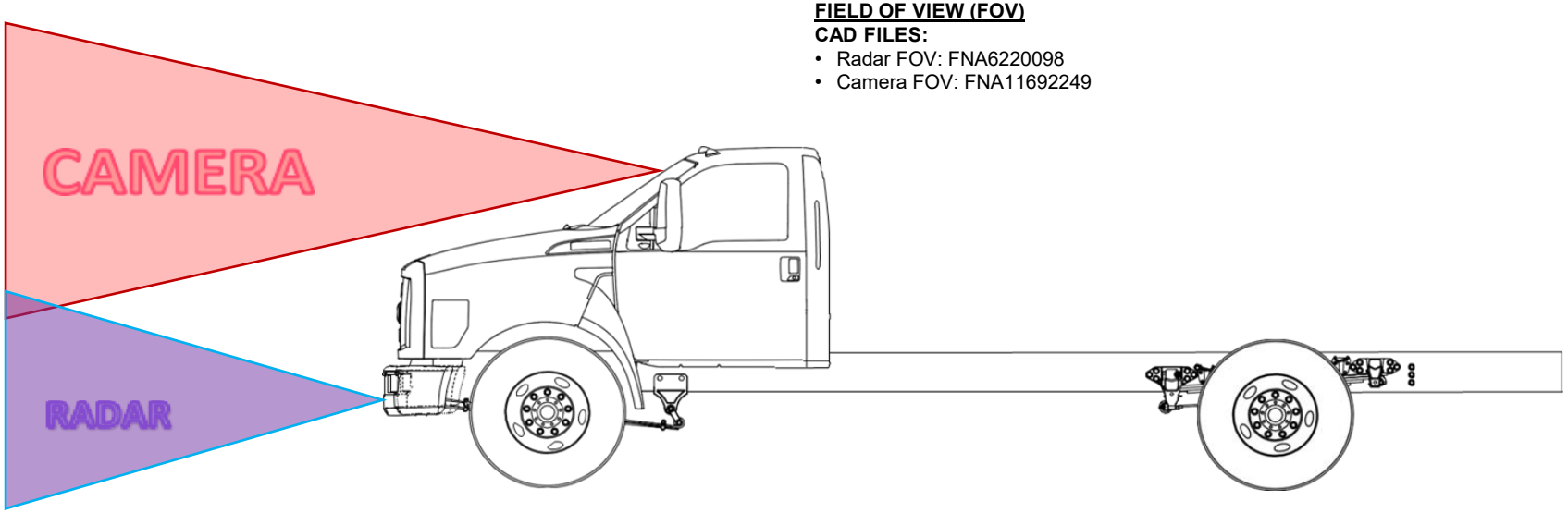
IMPORTANT

- Not recommend relocating camera or radar
- ADAS hardware cannot be added to vehicle post production.
- Verify location when using aftermarket hood mounted mirrors which could possibly interfere with camera "field of view"
- Not recommend equipping vehicles with winch systems, cones, cables, license plates (center) which could possibly obstruct/interfere with radar and camera "field of view"
- Not recommend applying paint or decals to radar or cover which could possibly obstruct/interfere radar field of view
- Not recommend applying decals or objects to the front of windshield which could possibly obstruct/interfere camera "field of view." Over roof systems that extend forward of windshield ensure that it does not interfere with camera "field of view".
- Not recommend using aftermarket suspension components (e.g. Adding air ride, helper springs, lift kits, etc.) Which could possibly obstruct/interfere radar and camera field of view zones
- Not recommend using front bumper system to push other objects/vehicles this is to prevent any damage or misalignment to radar and cover.
- Not recommend modifying or replacing factory equipped bumper with aftermarket sourced bumpers which may interfere with radar "field of view".
- If the camera or radar is blocked due to accumulation of dirt, ice, or snow in "field of view" - vehicle will display blockage message in cluster. Once blockage is removed, blockage message will stop being displayed
- Snowplow equipped vehicles will have a feature in cluster/sync screen to turn off ADAS.

Lane Departure Warning and Pre-Collision Assist features (if equipped) can be turned off via steering wheel button or Driver Assistance Menu in SYNC, respectively. These selections would latch over key cycle. Note, the driver will be prompted in the cluster to turn Pre-Collision Assist back on or leave it off at every key cycle.

FIELD OF VIEW (FOV)
CAD FILES:

- Radar FOV: FNA6220098
- Camera FOV: FNA11692249



MEDIUM DUTY F-650/750

GUIDELINES FOR MODIFYING WHEELBASES – HYDRAULIC BRAKES

F-650 and F-750 with Hydraulic Brakes

All F-650 & F-750 have Electronic Stability Control (ESC) as STANDARD equipment, with an option to delete ESC. **Wheelbase modification of a truck equipped with ESC affects vehicle function, which may result in sub-standard performance of the ESC system and/or ESC, Anti-lock Brake or Traction Control faults/lights unless module calibrations are updated as appropriate for the modified wheelbase.**

Ford supports upfitters that modify wheelbases of affected vehicles with ESC with an app in the Ford Diagnosis and Repair System (FDRS) tool that will update ESC calibrations as needed. See the FDRS Wheelbase Configuration Application section on the next page for details on how to use the app. Subsequent stage manufacturers that do not have an FDRS tool can purchase the software license and check for compatible scan tool hardware here, or contact their local Ford Dealership for assistance.

Modified wheelbase lengths within the ranges provided below are supported by the FDRS Wheelbase Configuration App. Each individual range of wheelbase length provided represents a unique ESC calibration. In most cases, the factory wheelbase and modified wheelbase lengths will be in different ranges and will require use of the FDRS Wheelbase Configuration App to revise the ESC calibration. In cases where the factory wheelbase and modified wheelbase are within the same range, the ESC calibration does not need to be updated.

F-650 – F-750 Medium Trucks with Hydraulic Brakes

- All GVWR
  - 146-163”
  - 164-180”
  - 181-195”
  - 196-208”
  - 209-229”
  - 230-243”
  - 244-257”
  - 258-272”
  - 274-281”

If a modified wheelbase length outside of the listed ranges is planned, the vehicle should be ordered with the available ESC Delete option as it will not be supported with proper ESC calibrations.

Whether the FDRS tool is used to update the vehicle calibrations or not, it is the responsibility of the final stage manufacturer to evaluate the completed vehicle to ensure vehicle performance is acceptable to the end customer.

NOTES:

- The chassis wheelbase shall not be modified shorter than the shortest factory wheelbase offered for that series or GVWR
- Vehicles with Lane Departure Warning feature: The chassis wheelbase should not be shortened more than 16 inches from the original wheelbase as the feature performance will be negatively affected.
- Vehicles with Tire Pressure Monitor System (TPMS) feature: Increasing the distance between the TPMS receiver module and either front or rear axle beyond the largest spacing provided by Ford may negatively affect feature performance. The final stage manufacturer is responsible for evaluating TPMS system performance on the completed vehicle.
- Statements of Conformity in the vehicle Incomplete Vehicle Manual may have conditions that are affected by the vehicle wheelbase. Please review the IVM and use the modified wheelbase value to complete assessments where appropriate.
- The General Body Builder Layout Book contains much information regarding wheelbase modifications. A search for the term “wheelbase” within the General BBLB will reveal related content, see the following sections under “Design Recommendations” at a minimum:
  - Fuel System
  - Electrical – sections regarding “Electrical Wiring”
  - Brake System
  - Frame – sections on wheelbase modifications for light and medium vehicles

GUIDELINES FOR MODIFYING WHEELBASES – HYDRAULIC BRAKES - CONT

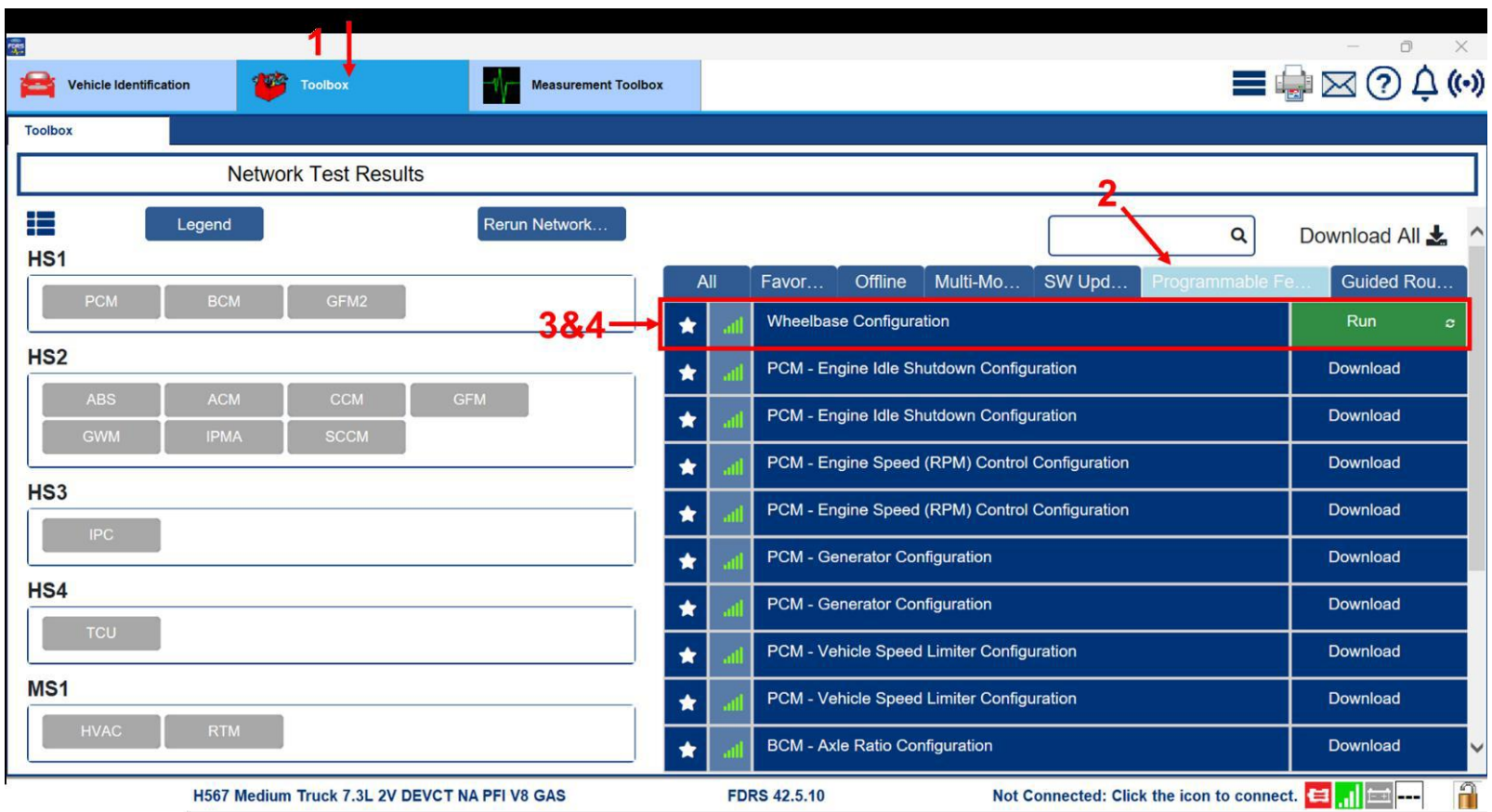
FDRS Wheelbase Configuration Application

This application will be used to update the ABS software and load the correct ESC calibration for the modified vehicle wheelbase.

Open the Ford FDRS tool and connect to the vehicle being modified, then:

1. Select “Toolbox”
2. Select “Programmable Features”
3. Download the latest version of “Wheelbase Configuration”
4. Run “Wheelbase Configuration”
5. Password: “M43WBSTRETCH” (all caps)
6. When prompted, you will need to select the range the modified wheelbase falls into (all values in Inches)

Screen Captures from the FDRS tool are provided below to help visualize the selections.



MEDIUM DUTY F-650/750

GUIDELINES FOR MODIFYING WHEELBASES AND CENTER OF GRAVITY SELECTION - AIR BRAKES

F-650 and F-750 with Air Brakes

All F-650 & F-750 have Electronic Stability Control (ESC) as STANDARD equipment, with an option to delete ESC. When ordering a vehicle with air brakes (with standard ESC), a "Special Build Requirement" order code must be selected indicating the estimated Vertical Center of Gravity of the completed vehicle to ensure the correct ESC calibration. See available codes below:

Special Build Requirement–LOW–38" to 48" Center of Gravity (Requires 67A). Not available with ESC Delete (18A)	98B
Special Build Requirement–MEDIUM–48" to 58" Center of Gravity (Requires 67A). Not available with ESC Delete (18A)	98C
Special Build Requirement –HIGH–58"–68" Center of Gravity (Requires 67A). Not available with ESC Delete (18A)	98E
Special Build Requirement- TANKER HIGH–58" to 68" Center of Gravity (Requires 67A). Not available with ESC Delete (18A)	98F
Special Build Requirement-–TANKER MEDIUM–48" to 58" Center of Gravity (Requires 67A). Not available with ESC Delete (18A)	98J

Wheelbase modification or a completing a vehicle with CGv outside of the selected range affects vehicle function for a truck equipped with ESC, which may result in sub-standard performance of the ESC system and/or ESC, Anti-lock Brake or Traction Control faults/lights.

ESC Delete (Sales Code 18A) should be selected for chassis with air brakes where the vehicle vertical center of gravity (CG) is not known at the time of order OR for other anticipated modifications such as wheelbase length modifications, aftermarket 4x4 conversions, rear suspension revisions, etc.

NOTE: THERE ARE NO PROVISIONS TO REVISE THE ESC MODULE CALIBRATION ONCE VEHICLES WITH AIR BRAKES HAVE BEEN PRODUCED BY FORD.

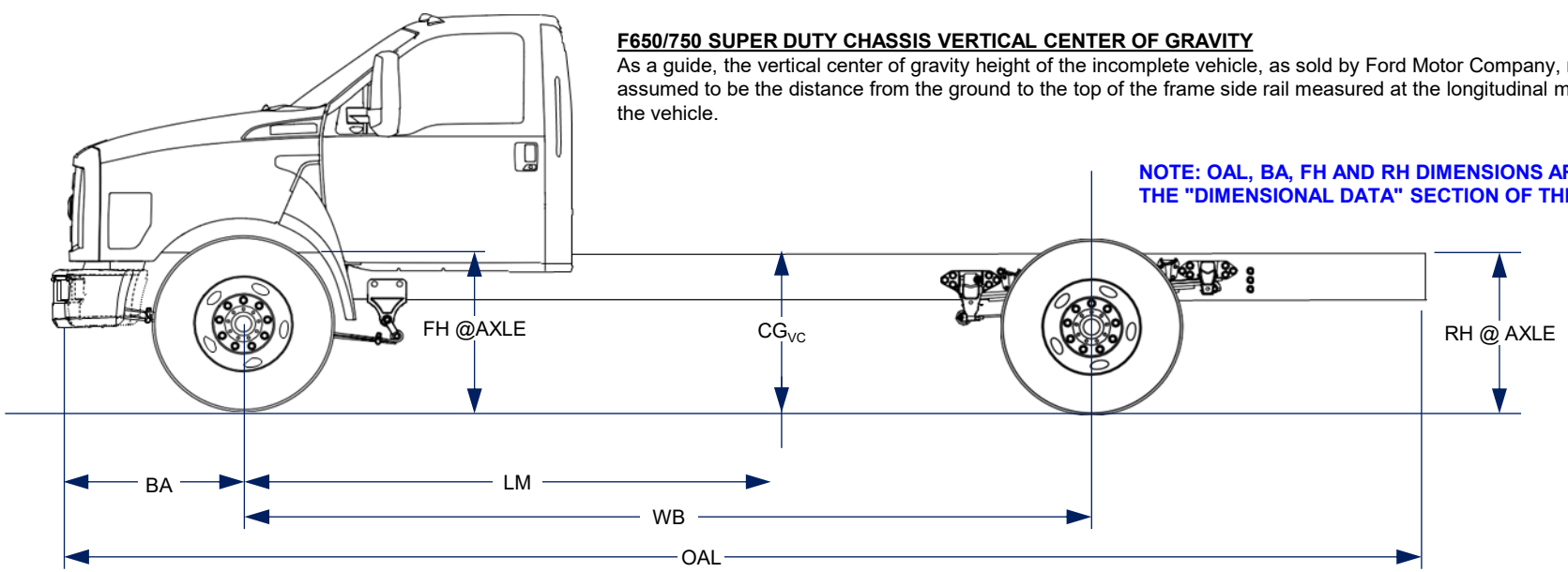
NOTES ON WHEELBASE MODIFICATIONS:

- The chassis wheelbase shall not be modified shorter than the shortest factory wheelbase offered for that series or GVWR
- Vehicles with Tire Pressure Monitor System (TPMS) feature: Increasing the distance between the TPMS receiver module and either front or rear axle beyond the largest spacing provided by Ford may negatively affect feature performance. The final stage manufacturer is responsible for evaluating TPMS system performance on the completed vehicle.
- Statements of Conformity in the vehicle Incomplete Vehicle Manual may have conditions that are affected by the vehicle wheelbase. Please review the IVM and use the modified wheelbase value to complete assessments where appropriate.
- The General Body Builder Layout Book contains much information regarding wheelbase modifications. A search for the term "wheelbase" within the General BBLB will reveal related content, see the following sections under "Design Recommendations" at a minimum:
  - Fuel System
  - Electrical – sections regarding "Electrical Wiring"
  - Brake System
  - Frame – sections on wheelbase modifications for light and medium vehicles

F650/750 SUPER DUTY CHASSIS VERTICAL CENTER OF GRAVITY

As a guide, the vertical center of gravity height of the incomplete vehicle, as sold by Ford Motor Company, may be assumed to be the distance from the ground to the top of the frame side rail measured at the longitudinal midpoint of the vehicle.

NOTE: OAL, BA, FH AND RH DIMENSIONS ARE PROVIDED IN THE "DIMENSIONAL DATA" SECTION OF THIS BBLB



ELECTRICAL: EXTERIOR VEHICLE LIGHTING CONTROLS & LIGHTING GENERAL GUIDELINES

Although there are many points in the truck electrical system to connect additional circuits certain connection points are recommended for reliability and convenience. This section defines the recommended connection points for each Ford Truck model and the maximum electrical loads allowable.

LIGHTS CONTROLLED BY HEADLAMP SWITCH

The low beam and high beam headlamps are powered by FETs located in the Body Control Module (BCM). The headlamp switch used in the Super Duty F-Series vehicles is a low current switch designed to signal the BCM to activate all exterior lighting. The headlamp switch cannot handle any added load.

A connection to any circuit in the system controlled by the headlamp switch must be done using an auxiliary relay. Rear lighting and turn signal lamp relays are provided for body builder usage. These are shown elsewhere in this document. Any "headlamp" connections must be performed on the lighting output of the BCM. The BCM headlamp output pins are capable of up to 6.8A each. They are able to handle the load of the vehicle headlamps plus the added load of a relay coil. Either an upfitter relay (inside the BJB) or an aftermarket installed relay can be used to supply the power for auxiliary headlamps.

LIGHTS CONTROLLED BY STOP LAMP SWITCH AND TURN INDICATOR SWITCH

NOTE: Splicing into the stop lamp switch can damage the Body Control Module (BCM). Splicing into the stop lamp switch on vehicles with Electronically Controlled Transmissions can interfere with the proper functioning of PCM, speed control, and anti-lock brake electronic modules. This can:

- Affect EFI engine idle speed quality.
- Prevent the Powertrain Control Module (PCM) controlled torque converter clutch from applying at throttle openings less than half-throttle.
- Deactivate anti-lock brake system operation.
- Prevent the speed control from disengaging upon braking.

A stop signal, as well as a reverse and left/right turn or stop/turn circuits are in the body builder connector.

The stop lamp switch that is in use on Ford trucks is a mechanical switch operated by brake pedal. The BCM supports adding loads to the brake pedal switch through a circuit MAT50 - which is YE/VT wire in driver footwell. Park brake circuit is CMC25 WH/VT, which is located in the engine compartment body builder. Connector, cavity 1. Tapping into other BCM inputs, such as Door Ajar, can cause BCM failure. Under no circumstances are additional brake pedal loads to be added by directly splicing into vehicle wiring.

The turn signal switch is designed to use a low current to signal the BCM to activate turn signal and stop lamps. The switch is not designed to directly power any lamps or other electrical devices.
If both turn signal and stop lamp function are desired for added lights, access the body builder connector located behind the cab or at the end of frame. Do not splice into turn/stop circuits at the BCM or turn circuits at the multi- function switch. Splicing in those areas will damage the switch or cause the BCM to malfunction. Use the trailer tow circuits and trailer tow relays to power added turn/stop lights. Circuits are accessible at the body builder connector located behind the cab or at the end of frame; LT/Stop=YE, RT/Stop=GN.

Reverse/back-up lights must be tied-in using trailer tow relays and circuits in same manner as turn/stop lights.

WIPER DELAY MODULE

The Wiper Delay Module is not internally protected for a continuous high current load greater than 9 amps and must be protected either internal to the wiper motor or via inline protection such as a properly sized circuit breaker. The existing 30-amp fuse in the fuse panel is sized for the maximum allowable in-rush current and does not provide appropriate protection to the Wiper Delay Module.

NOTE: ADDTIONAL ELECTRICAL INFORMATION CAN BE ACCESSED VIA THE WEB AT: https://www.fordpro.com/en-us/upfit/bbas/ UNDER THE "BULLETINS" TAB.

NOTE: The final stage manufacturer is responsible for ensuring that the final vehicle configuration meets all applicable regulatory requirements.

MEDIUM DUTY F-650/750

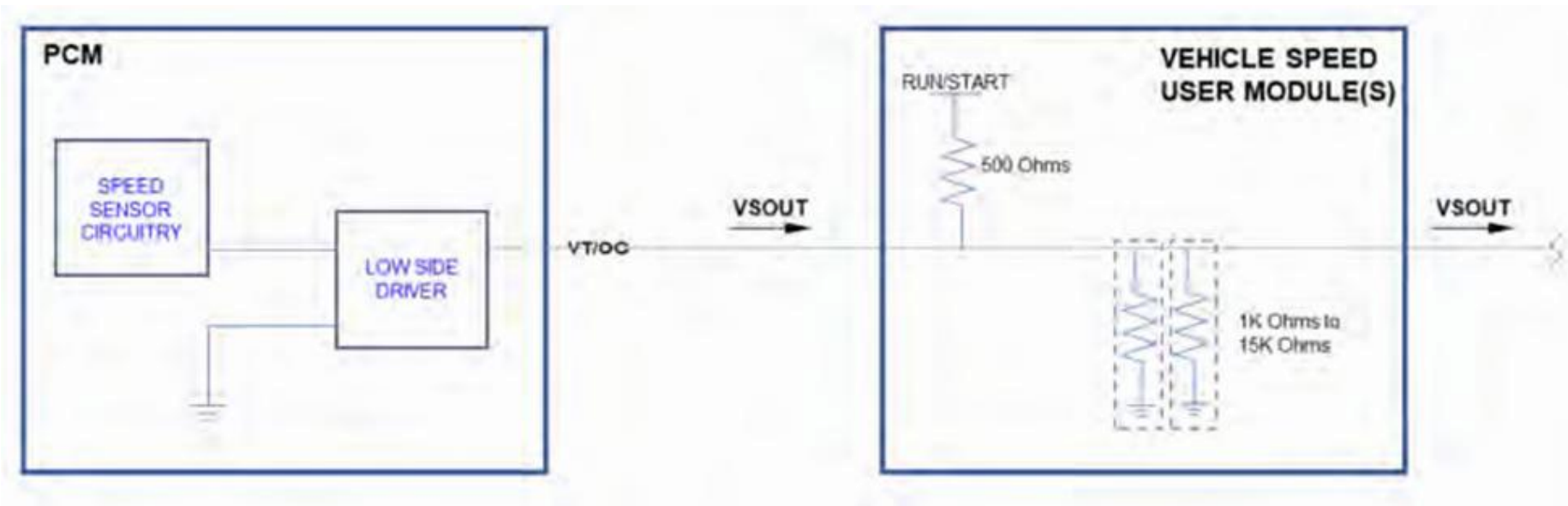
ELECTRICAL: CLEAN TACHOMETER OUTPUT (CTO) & VEHICLE SPEED OUT (VSO) SIGNALS

ELECTRICAL WIRING GENERAL INFORMATION

F650/750 vehicles are equipped with several conveniently located electrical wiring taps. Most taps are fused, having locations under the instrument panel or in the body builder connections located forward of the cab (near the brake master cylinder),behind the cab or at the end of the frame. The circuits behind the cab or at the rear of the frame are provided to support trailer wiring requirements or the Second Unit Body (SUB) additions. The F650/750 Circuit charts have a brief description of each circuit function, wire gauge, color code and electrical schematic.

- F650/750 vehicles are equipped with a clean tachometer output (CTO) wiring tap. The tap is designated circuit CE913 (BU) and is located cavity 12 in underhood upfitter connector. This tap should be used if a tachometer signal is required. The signal is digital and requires a digital tachometer. The signal pulse rate is half the number of engine cylinders per revolution (i.e., 4 for 6.7L diesel, 5 for 7.3L gasoline).
- F650/750 vehicles are also equipped with a vehicle speed out (VSO). The VSO tap is designated circuit VMC05 (VT/OG). The tap is located cavity 10 in underhood upfitter connector's VSO tap signal frequency is 2.22 times the vehicle speed in miles per hour.

The PCM provides an output signal, VSOUT (VT/OG), at a frequency 2.22 times vehicle speed, in MPH. This signal switches from OFF to ON repeatedly at a frequency dependent on vehicle speed. To properly access this output, the intermediate/final stage manufacturer will need to add a 500 Ohm pull-up resistor to the VSOUT circuit. One connection must made to the RUN/START circuit (12 Volts), and the other end connected to the VSOUT circuit. Another resistor must be added and connected to the same VSOUT circuit, and the other end of this resistor will be connected to ground. Using a 15K Ohm pull-down resistor will result in a voltage signal that is closer to RUN/START (12 Volts) voltage during in the OFF state (ground in the ON state). Therefore, on the VSOUT circuit, the voltage will switch from 12 volts to ground at a frequency dependent on vehicle speed. (See figure below)



NOTE: ADDTIONAL ELECTRICAL INFORMATION CAN BE ACCESSED VIA THE WEB AT: HTTPS://WWW.FORDPRO.COM/EN-US/UPFIT/BBAS/, UNDER THE "BULLETINS" TAB.

Ford PRO

Body Builders Layout Book

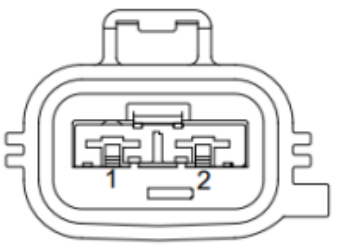
MEDIUM DUTY F-650/750

ELECTRICAL: REAR BODY BUILDER & TRAILER TOW CONNECTOR INFORMATION

REAR BODY BUILDER CONNECTOR - A 98AG-14A624-EHB				
PIN	CIRCUIT	COLOR	GAUGE	CIRCUIT FUNCTION
1	CAT11	BN	2.5	TRAILER TOW PARK LAMP RELAY OUTPUT
2	CAT16	GY-BN	1.5	TRAILER TOW REVERSE LAMP RELAY OUTPUT
3	MAT50	YE-VT	2.5	TRAILER TOW STOP LAMP RELAY OUTPUT
4	-	-	-	-
5	CAC09	BN-WH	1.5	UCA #1
6	CAC10	WH-RD	1.5	UCA #2
7	CAT06	YE-YT	1.5	TRAILER TOW LH STOP/TURN RELAY OUTPUT
8	CAT09	GN	1.5	TRAILER TOW RH STOP/TURN RELAY OUTPUT

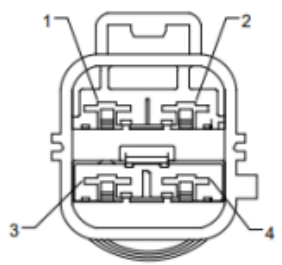
Rear Body Builder-A
8 Pin Connector 98AG-14A624-EHB

REAR BODY BUILDER CONNECTOR - B JU5T-14A624-YA				
PIN	CIRCUIT	COLOR	GAUGE	CIRCUIT FUNCTION
1	RAT08N	WH-OG	4.0	TRAILER TOW RETURN
2	RAT08G	WH-OG	4.0	TRAILER TOW RETURN



Rear Body Builder-B
(2 pin) Connector: JU5T-14A624-YA

TRAILER TOW C-1 6U5T-14A464-CA				
PIN	CIRCUIT	COLOR	GAUGE	CIRCUIT FUNCTION
1	CAT09	GN	3.0	TRAILER TOW RIGHT STOP/TURN LAMP
2	CAT11	BN	3.0	TRAILER TOW PARK LAMPS
3	CAT14	OG	3.0	TRAILER TOW BATTERY CHARGE RELAY OUTPUT
4	CAT18	BU	3.0	TRAILER TOW CUSTOMER ACCESS TRAILER BRAKE CONTROL (HYD.)

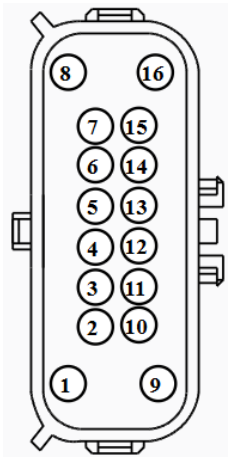


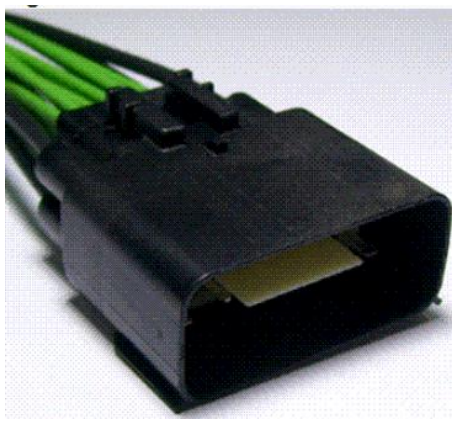
Trailer Tow C-1
(4Pin) Connector: JU5T-14A624-XA

TRAILER TOW CONNECTOR C-2 JU5T-14A624-XA				
PIN	CIRCUIT	COLOR	GAUGE	CIRCUIT FUNCTION
1	CAT11	BK	3.0	TRAILER PARK LAMPS
2	RAT08	WH	5.0	GROUND
3	CAT06	YE	3.0	TRAILER TOW LEFT STOP/TURN
4	MAT50	RD	3.0	STOP LAMP RELAY OUTPUT

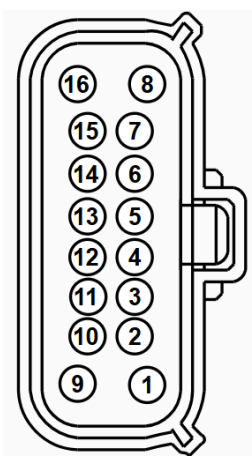
Trailer Tow C-2
(4Pin) Connector: 6U5T-14A464-CA

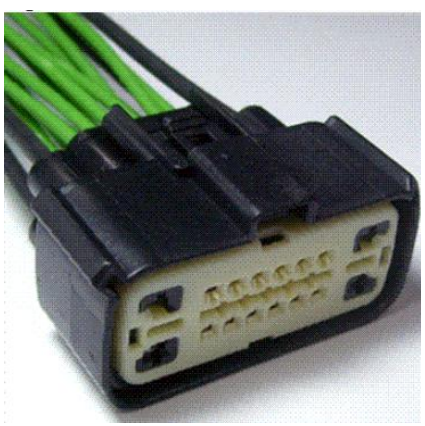
MEDIUM DUTY F-650/750
PTO INTERFACE CONNECTOR





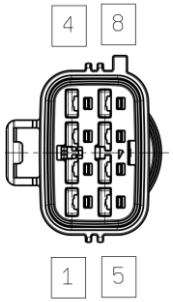
	Diesel	Gas		Vehicle Side
Pin	Circuit	Circuit	Gauge	Description
1	CMC25 (WH-VT)	CMC25 (WH-VT)	18/20	Park Brake Switch (Air Brakes=20 Ga.)
2	CE140 (BN)	CE140 (BN)	20	Battery Charge Protect Indicator (BCPL) (BCPIL)
3	RE327 (GY-RD)	RE407 (YE-VT)	20	PTO Signal Return Ground
4	CE912 (YE-GN)	CE912 (YE-GN)	20	Power Take-Off (PTO) Request 1
5	CE933 (BU-OG)	CE933 (BU-OG)	20	Power Take-Off (PTO) Request 2
6	CE926 (VT-BN)	CE926 (VT-BN)	20	Battery Charge Protect Switch (BCPSW)
7	CE914 (GN)	CE914 (GN-OG)	20	Power Take-Off Idle Control (RPM input) (PTOIC)
8	SBB27 (BU-BN)	SBB27 (BU-BN)	14	Fuse #27 (20 A) Hot-At-All-Times
9	CBK03 (GY)	CBK03 (GY)	16	Fuse #34 (10A) PCM Controlled Power Relay
10	VMC05 (VT-WH) 18 Ga.	VMC05 (VT-RD) 20 Ga.	18/20	Vehicle Speed Output (VSOUT)
11	CE326 (BU-WH)	CE326 (BU-RD)	20	Power Take-Off (PTO) Relay Control/Output
12	CE913 (BU) 18 Ga.	CE913 (BU) 20 Ga.	18/20	Clean Tachometer Output (CTO)
13	LE434 (WH-BN)	LE424 (YE-GY)	20	Powertrian Voltage Reference 5V+ (PTO VREF)
14	CET21 (GN-WH)	CET21 (GN-BN)	20	Transmission Range Output-Neutral (TRO-N)
15	CET22 (GY-BN)	CET22 (GY-BN)	20	Transmission Range Output-Park (TRO-P)
16	CBB48 (GY-BU)	CBB48 (GY-BU)	14	Fuse #48 (20A) Run/Accessory





	Diesel	Gas		Customer Connection Point
Pin	Circuit	Circuit	Gauge	Description
1	CMC25 (WH-VT)	CMC25 (WH-VT)	18	Park Brake Switch (Air Brakes=20 Ga.)
2	CE140 (BN)	CE140 (BN)	20	Battery Charge Protect Indicator (BCPL) (BCPIL)
3	RE327 (GY-RD)	RE407 (YE-VT)	20	PTO Signal Return Ground
4	CE912 (YE-GN)	CE912 (YE-GN)	20	Power Take-Off (PTO) Request 1
5	CE933 (BU-OG)	CE933 (BU-OG)	20	Power Take-Off (PTO) Request 2
6	CE926 (VT-BN)	CE926 (VT-BN)	20	Battery Charge Protect Switch (BCPSW)
7	CE914 (GN)	CE914 (GN-OG)	20	Power Take-Off Idle Control (RPM input) (PTOIC)
8	SBB27 (BU-BN)	SBB27 (BU-BN)	14	Fuse #27 (20 A) Hot-At-All-Times
9	CBK03 (GY)	CBK03 (GY)	16	Fuse #34 (10A) PCM Controlled Power Relay
10	VMC05 (VT-WH)	VMC05 (VT-RD)	20	Vehicle Speed Output (VSOUT)
11	CE326 (BU-WH)	CE326 (BU-RD)	20	Power Take-Off (PTO) Relay Control/Output
12	CE913 (BU)	CE913 (BU)	20	Clean Tachometer Output (CTO)
13	LE434 (WH-BN)	LE424 (YE-GY)	20	Powertrian Voltage Reference 5V+ (PTO VREF)
14	CET21 (GN-WH)	CET21 (GN-BN)	20	Transmission Range Output-Neutral (TRO-N)
15	CET22 (GY-BN)	CET22 (GY-BN)	20	Transmission Range Output-Park (TRO-P)
16	CBB48 (GY-YE)	CBB48 (GY-YE)	14	Fuse #48 (20A) Run/Accessory

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – 8-PIN CONNECTOR & MATE, TRAILER U-HAUL CONNECTOR



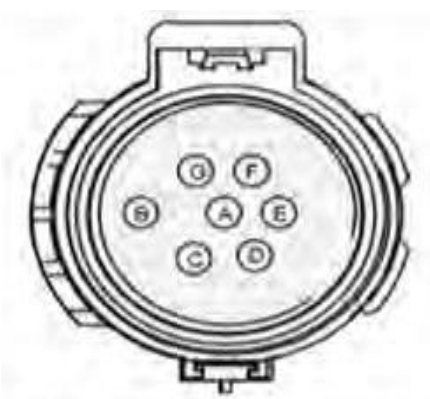
(8PIN) CONNECTOR: 98AG-14A624-EHB				
PIN	CIRCUIT	GAUGE	CIRCUIT FUNCTION	QUALIFIER
1	CAT11 (BN)	2.5	CTRL MOD - TRAILER TOW # PARK LAMPS (COLOR TO SAE 1239)	
2	CAT16 (GY)	1	RELAY - TRAILER TOW BACKUP LAMPS	
3	MAT50 (YE-VT)	3	RELAY - STOP LAMP	
4	-	-	Not Used	
5	CAC09 (BN-WH)	1.5	WIRE - UPFITTER CUSTOMER ACCESS #1	
6	CAC10 (WH-RD)	1.5	WIRE - UPFITTER CUSTOMER ACCESS #2	
7	CAT06 (YE)	1.5	CTRL MOD. - TRAILER TOW #TURN SIGNAL LEFT (COLOR TO SAE 1239)	
8	CAT09 (GN)	1.5	CTRL MOD. - TRAILER TOW #TURN SIGNAL RIGHT (COLOR TO SAE 1239)	

WPT-521 (Tin)
3U2Z-14S411-TZA

Connector :98AG-14A464-EHC Yazaki 7283-5574-10

Terminal: 1F1T-14474-KA AMP 1326032-6

Grommet: F8ZB-14603-AA YAZAKI-7158-3110-40

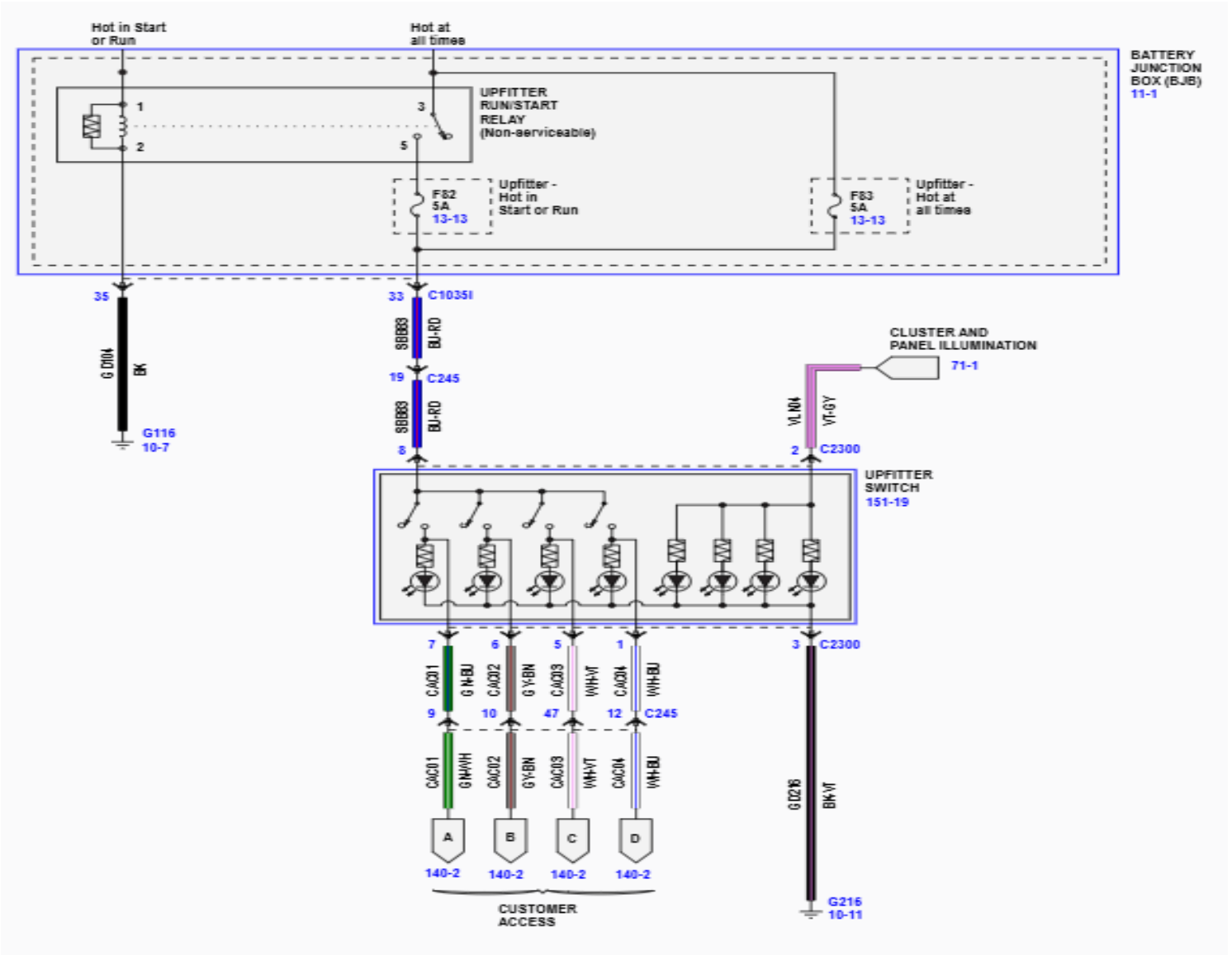


C4099 14406 - TRAILER U-HAUL CONNECTOR (PART# N/A)				
PIN	CIRCUIT	GAUGE	CIRCUIT FUNCTION	QUALIFIER
A	CAT16 (GY-BN)	14	RELAY - TRAILER TOW BACKUP LAMPS	
B	RAT08 (WH)	10	CTRL MOD. - TRAILER TOW # RETURN (USA ONLY- COLOR TO SAE 1239 EXCEPTION TO PSF)	
C	CAT18 (BU)	12	CONTROLLER - TRAILER TOW STOP LAMPS	
D	CAT09 (GN)	10	CTRL MOD. - TRAILER TOW # TURN SIGNAL	
			RIGHT (COLOR TO SAE 1239)	
E	CAT14 (BU)	12	RELAY - TRAILER TOW BATTERY CHARGING (COLOR TO SAE 1239)	
F	CAT11 (BN)	12	CTRL MOD. - TRAILER TOW # PARK LAMPS (COLOR TO SAE 1239)	
G	CAT06 (YE)	10	CTRL MOD. - TRAILER TOW # TURN SIGNAL LEFT (COLOR TO SAE 1239)	

MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BATTERY JUNCTION BOX

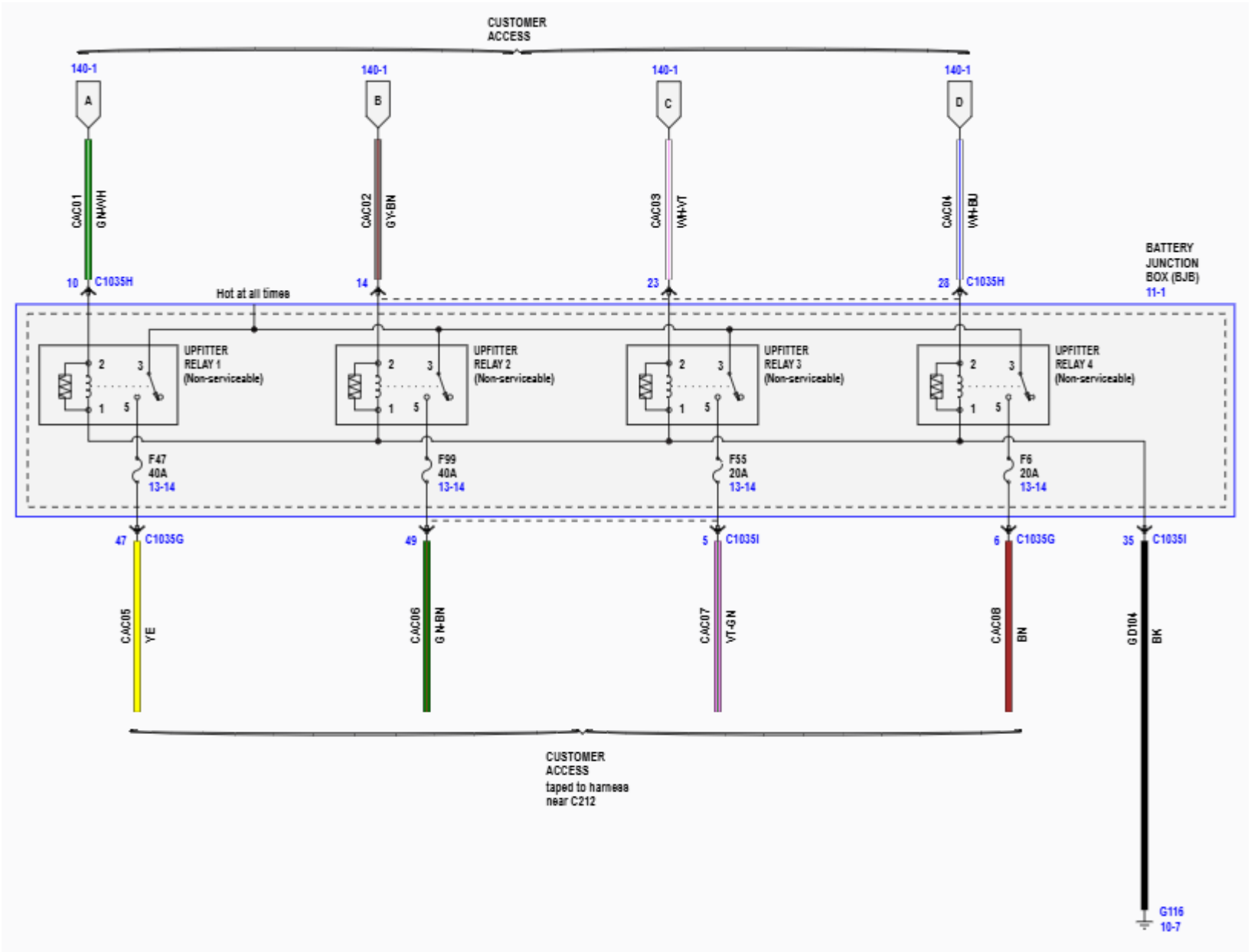
UPFITTER SWITCH



MEDIUM DUTY F-650/750

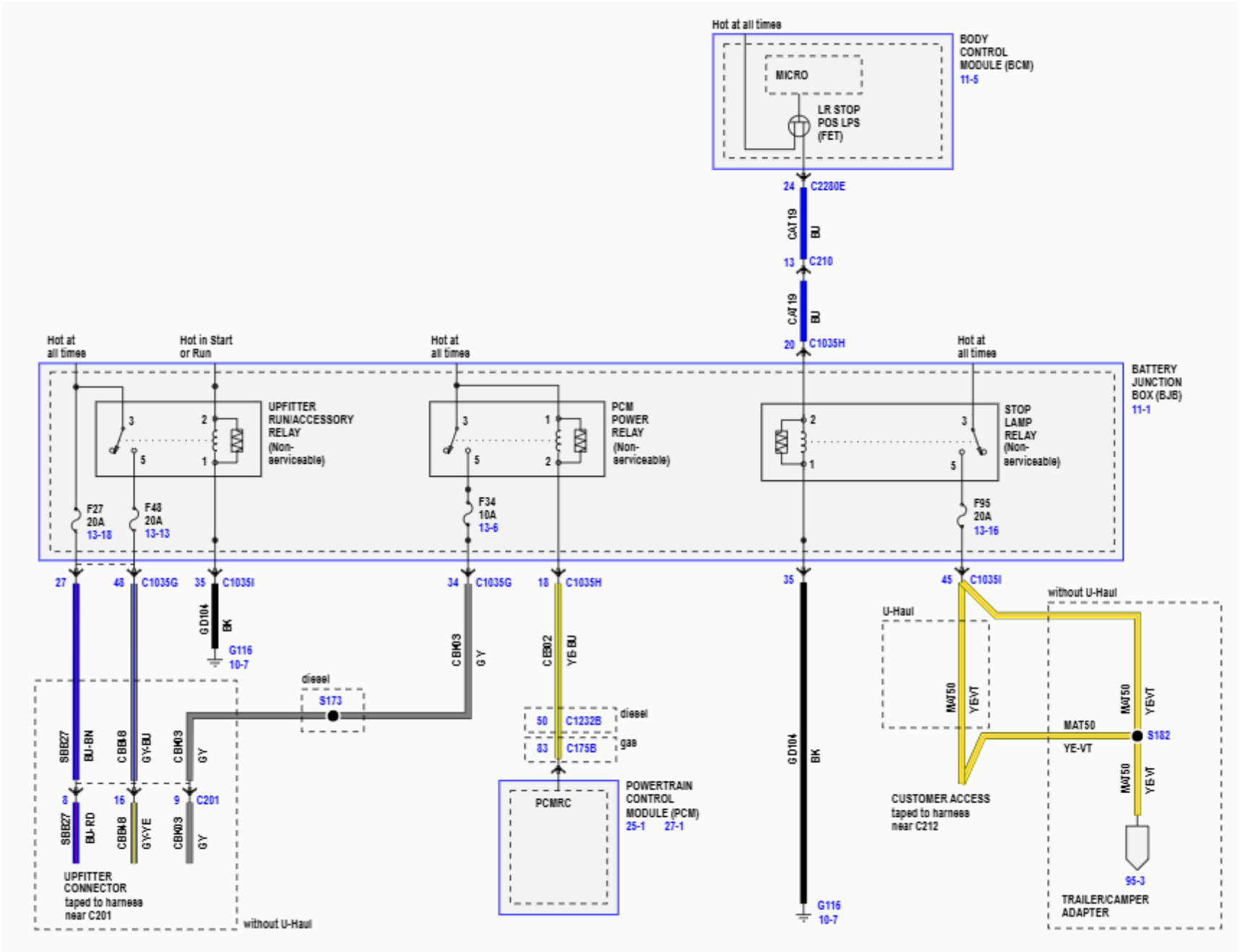
ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BATTERY JUNCTION BOX

UPFITTER SWITCH RELAYS



MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BODY CONTROL MODULE (BCM)

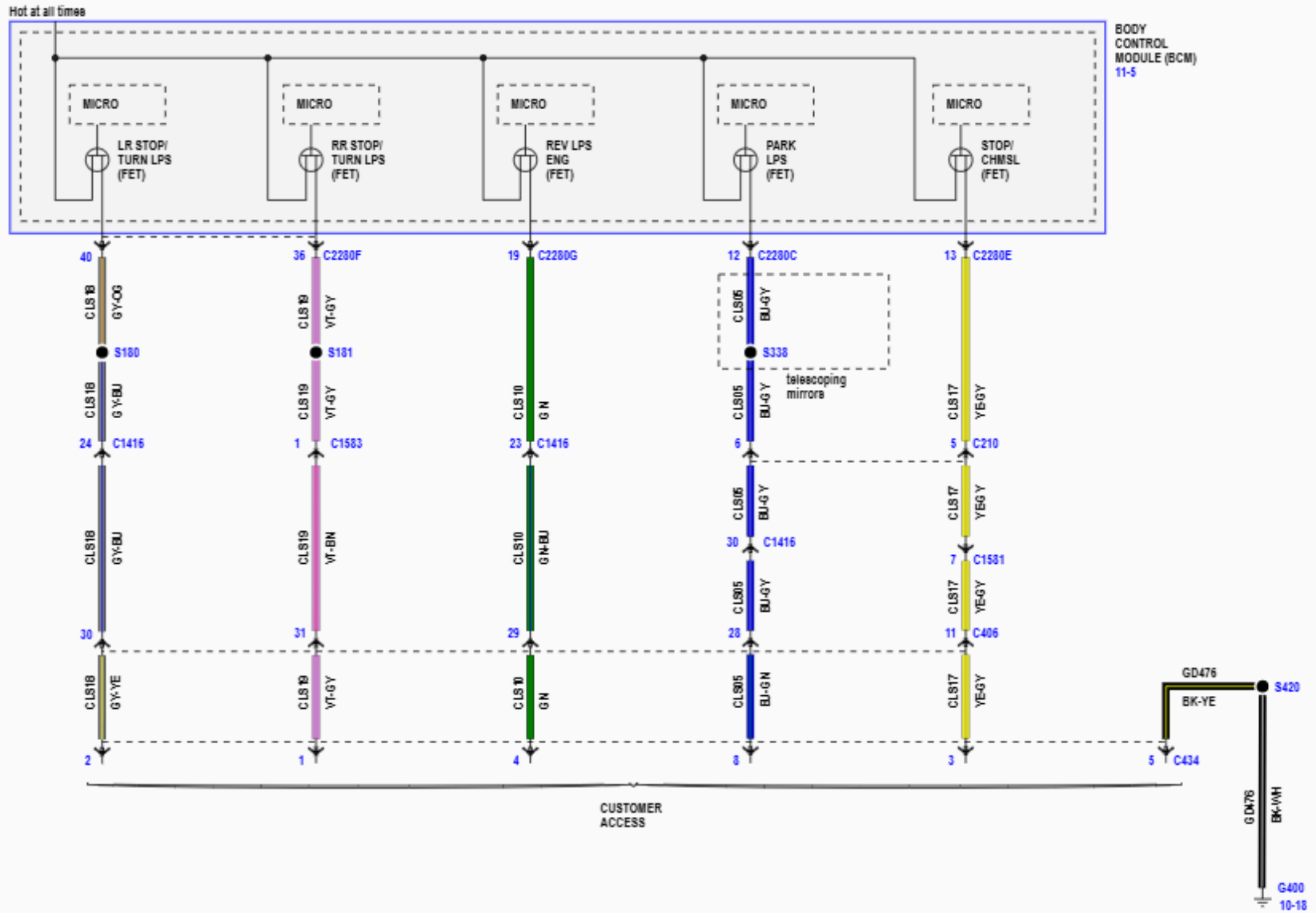


MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BODY CONTROL MODULE (BCM)

U-HAUL STOP/TURN LAMPS

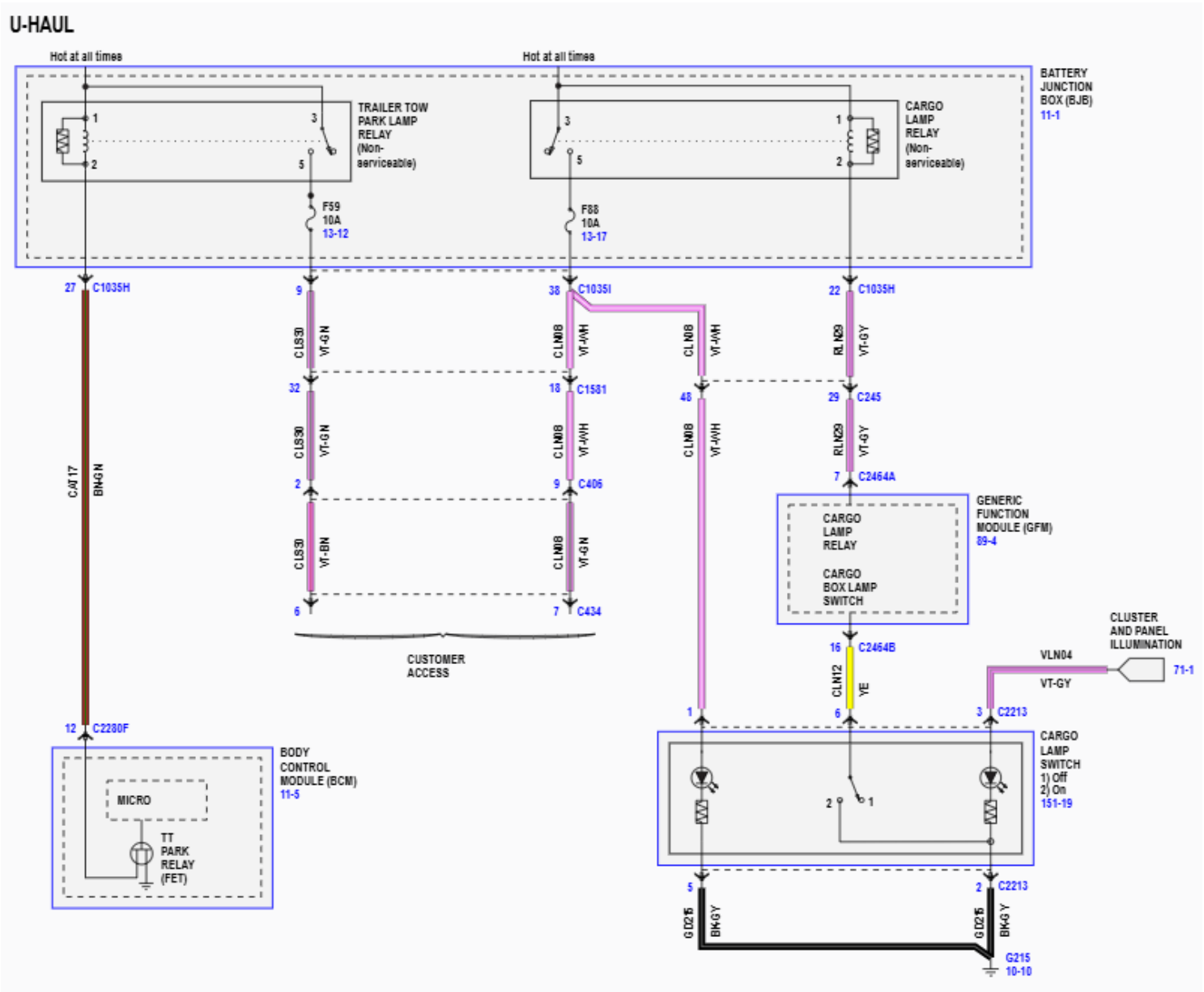
U-HAUL



MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BODY CONTROL MODULE (BCM)

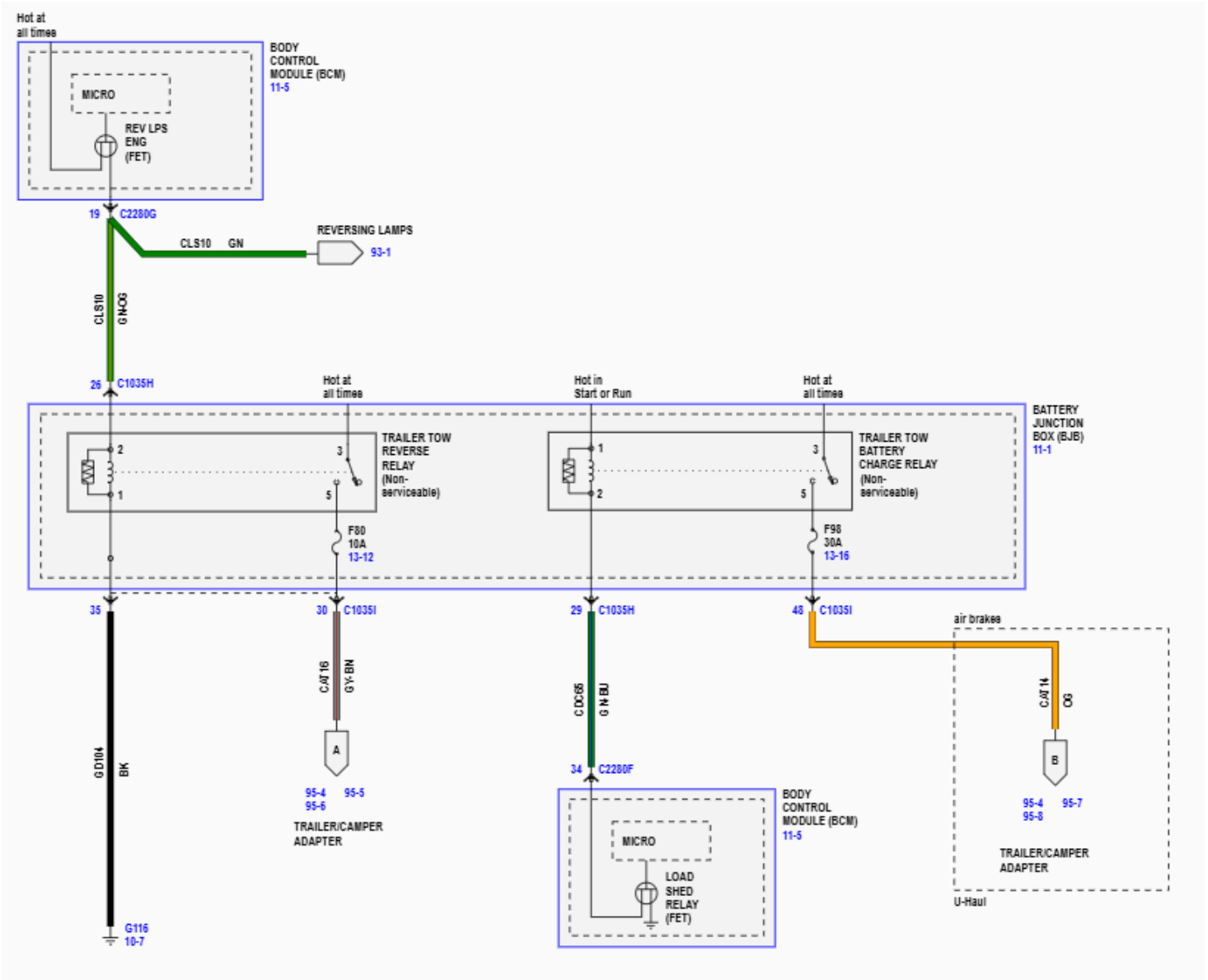
U-HAUL CARGO LAMP



MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BODY CONTROL MODULE (BCM)

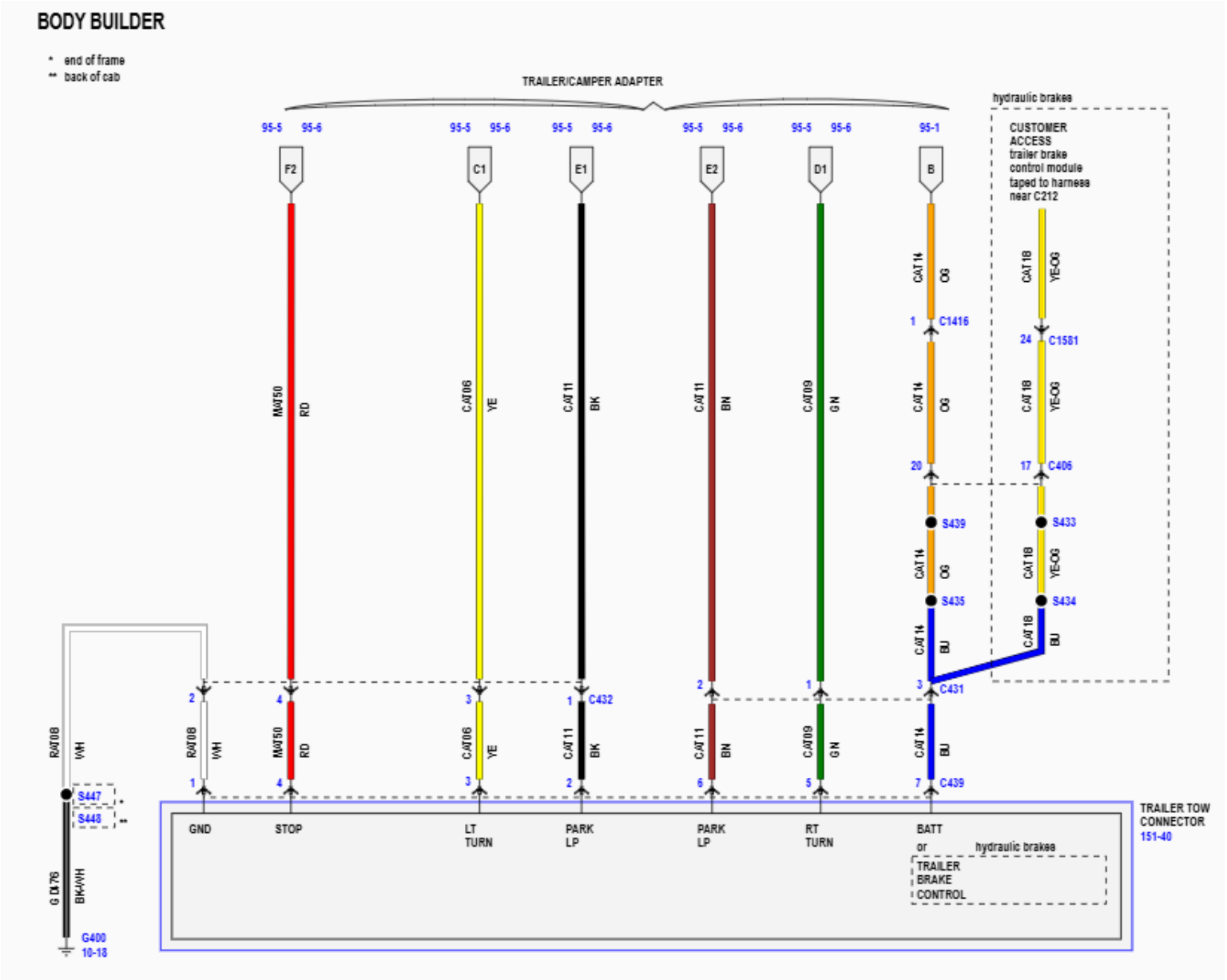
TRAILER/CAMPER ADAPTER



MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BODY CONTROL MODULE (BCM)

TRAILER/CAMPER ADAPTER

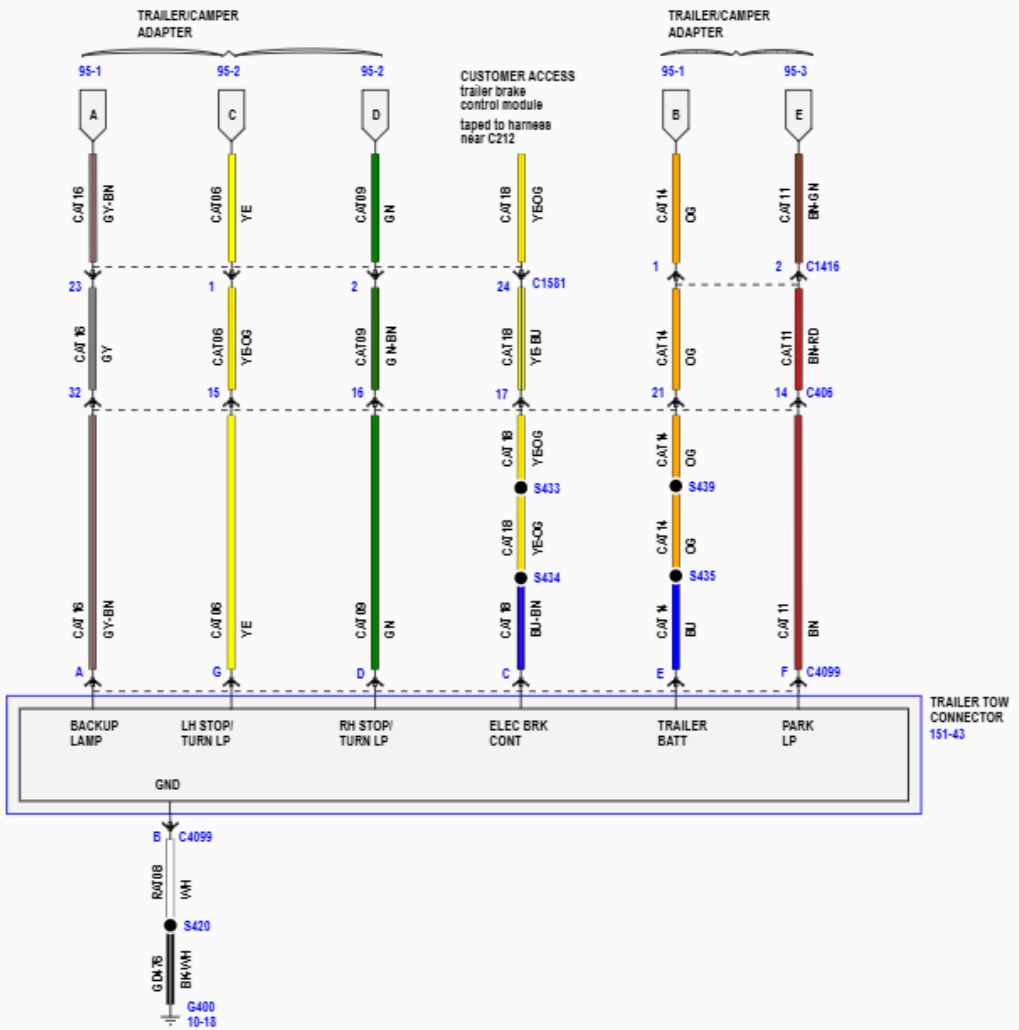


MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BODY CONTROL MODULE (BCM)

CAUTION: U-HAUL USES DIFFERENT

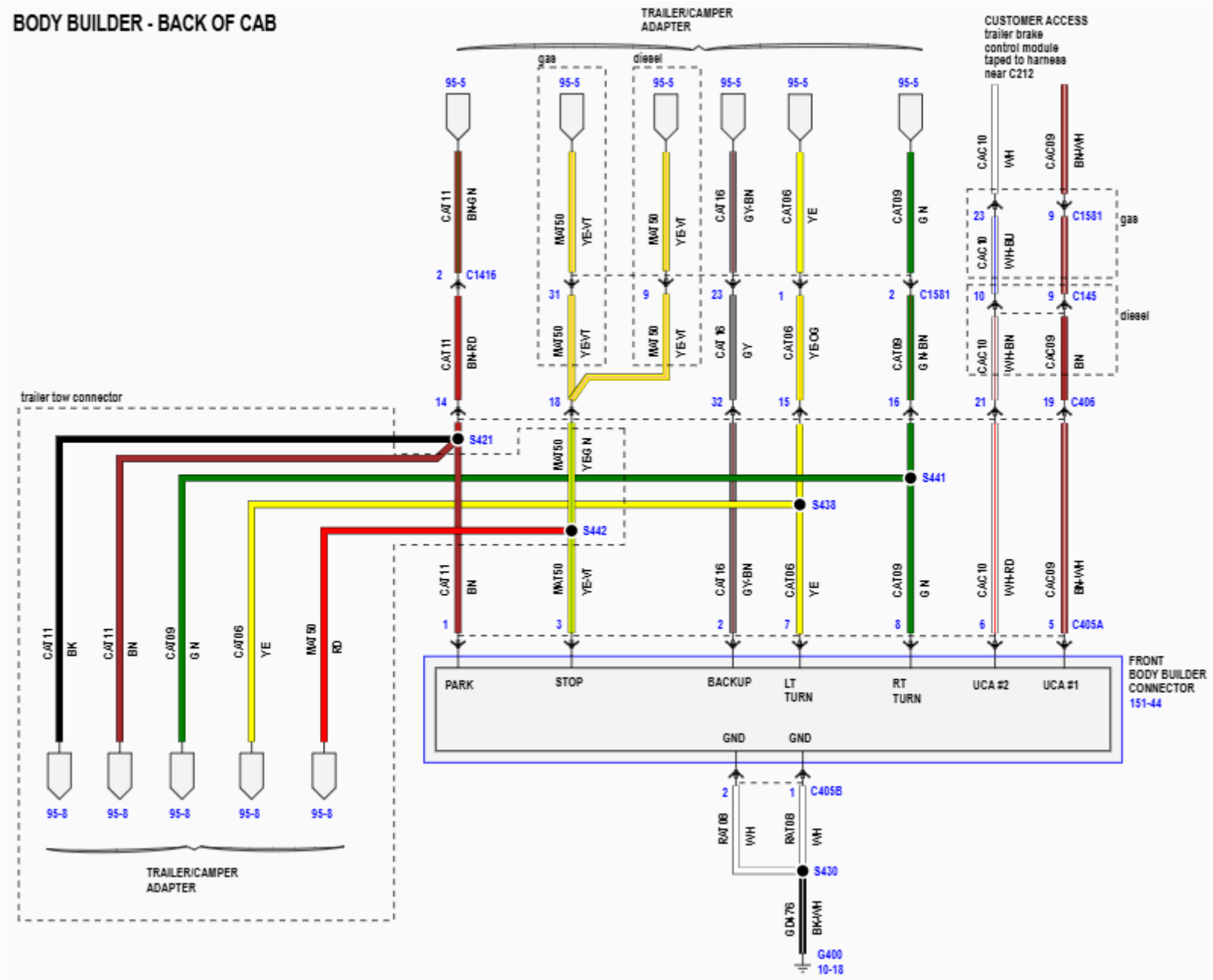
U-Haul



Body Builders Layout Book

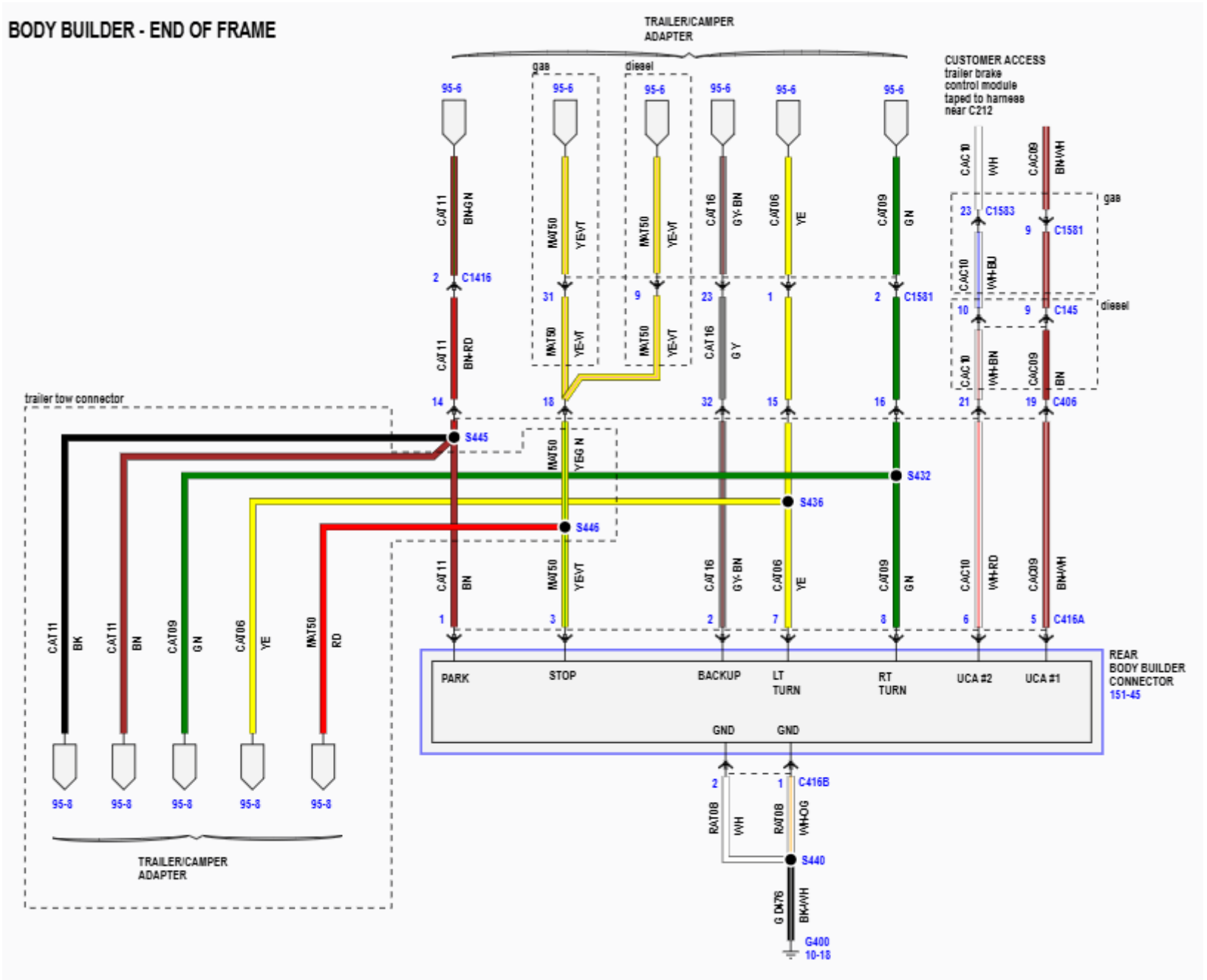
MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – BACK OF CAB

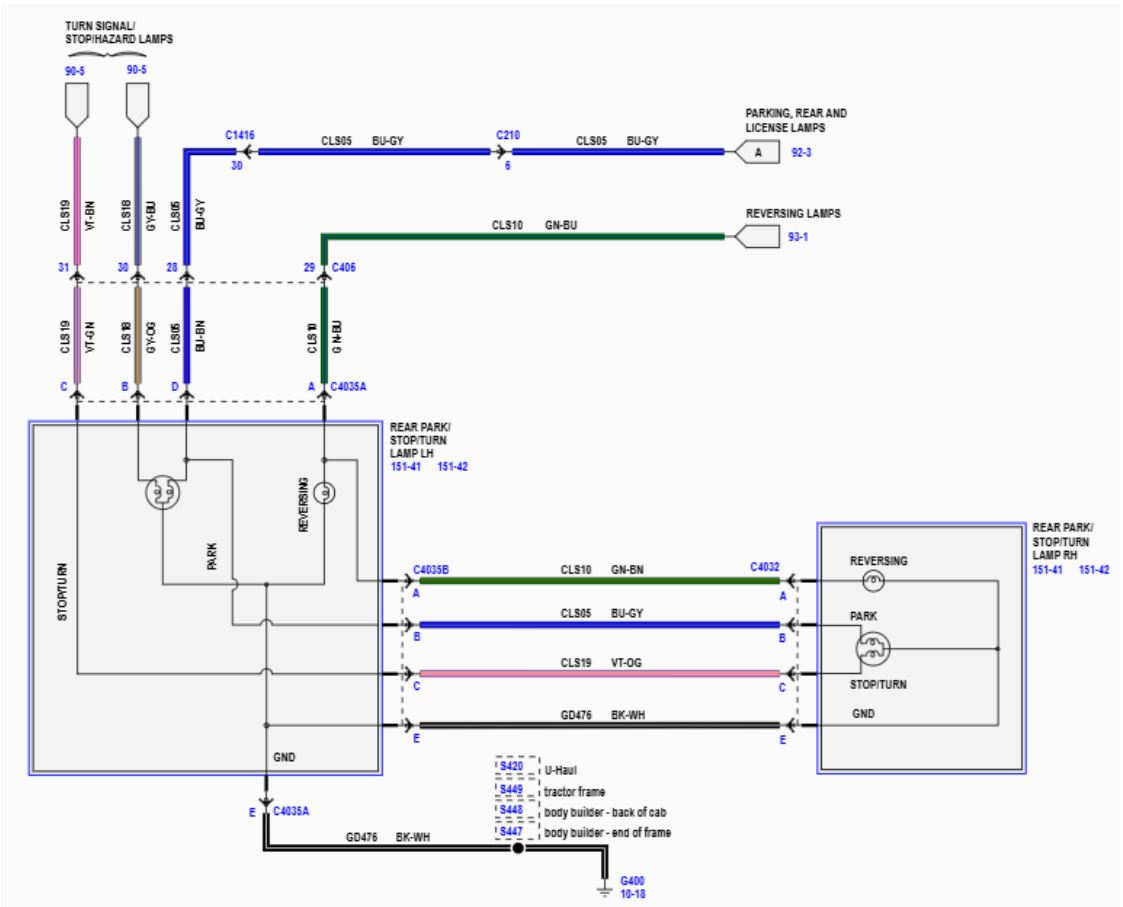


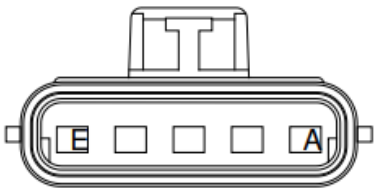
MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – END OF FRAME

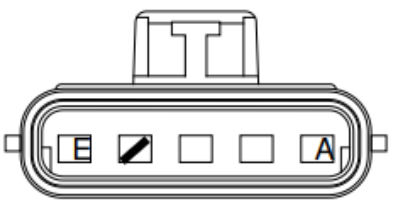


REAR TAIL LAMPS





Left Taillamp				
Pin	Circuit	Color	Gauge	Circuit Function
A	CLS10	GN-BU	14	REVERSE LEFT OR COMMON
B	CLS18	GY-OG	14	ECU - STOP/TURN LEFT (INBOARD)
C	CLS19	VT-GN	14	ECU - STOP/TURN RIGHT (INBOARD)
D	CLS05	BU-BN	16	ECU - PARK LAMPS 1
E	GD476	BK-WH	14	GROUND - FRAME REAR LEFT

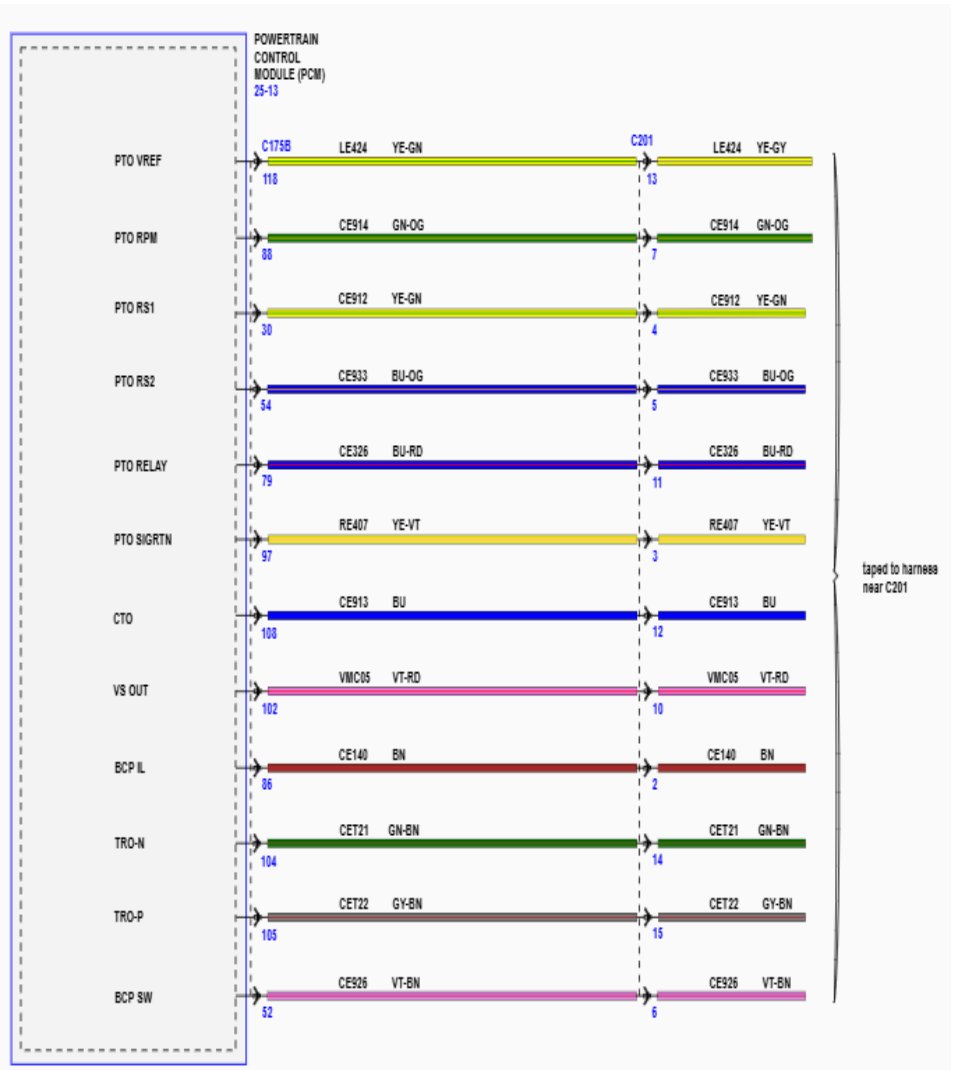


Right Taillamp				
Pin	Circuit	Color	Gauge	Circuit Function
A	CLS10	GN-BN	14	REVERSE LEFT OR COMMON
B	CLS05	BU-GY	14	ECU - PARK LAMPS 1
C	CLS19	VT-OG	14	ECU - STOP/TURN RIGHT (INBOARD)
D	~	~	~	~ ~ ~
E	GD476	BK-WH	14	GROUND - FRAME REAR LEFT

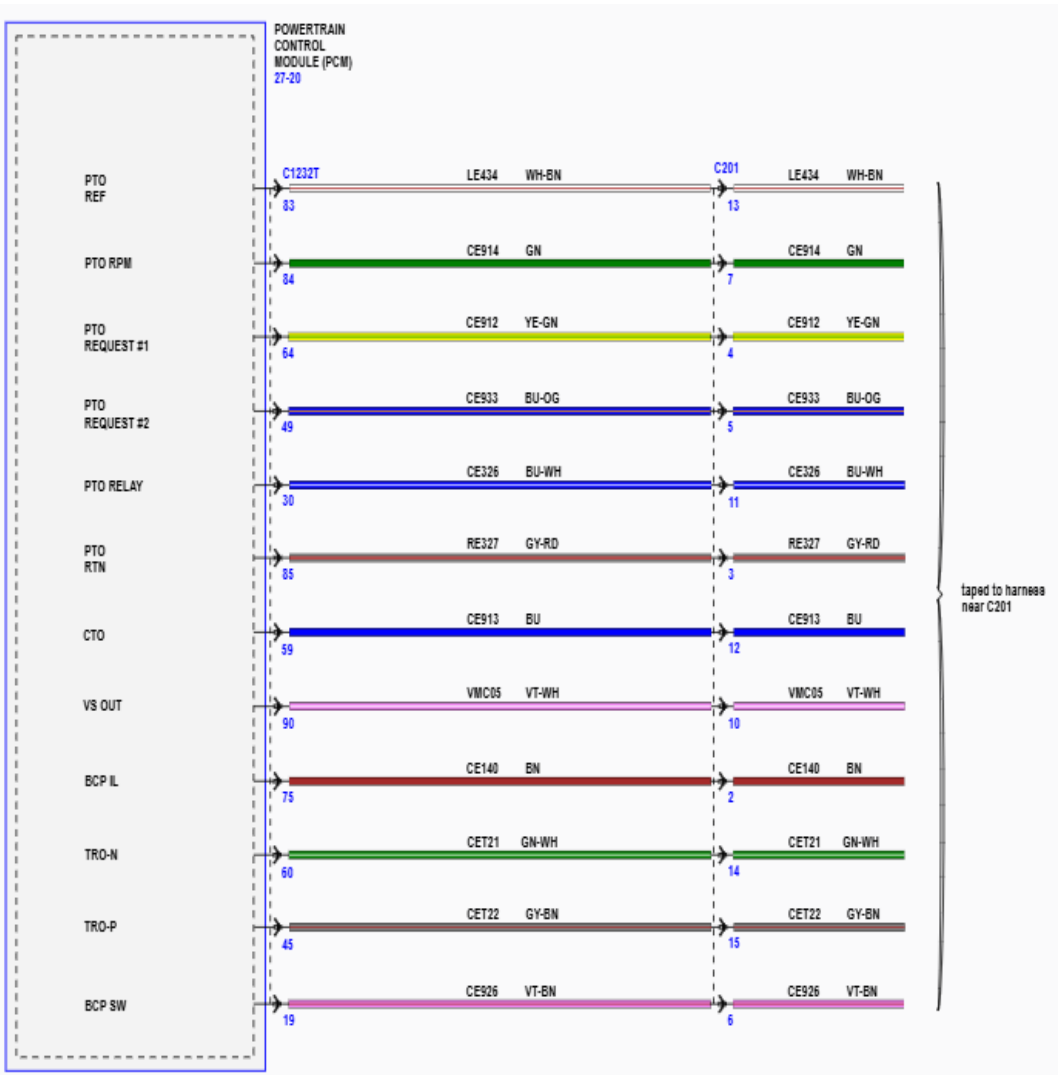
MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – POWERTRAIN CONTROL MODULE

GAS



DIESEL



MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS SIGNAL CIRCUITS & BATTERY VOLTAGE SOURCES

7.3L GAS & 6.7L DIESEL

CUSTOMER ACCESS SIGNAL CIRCUITS

FOUND: BLUNT-CUT & TAPED, IN CUSTOMER ACCESS HARNESS UNDER DRIVER'S SIDE DASH.

WIRE COLOR	WIRE TAG	CIRCUIT NO.	CIRCUIT INTENT	DESCRIPTION	
GRAY / BROWN	TRO P	CET22	OUTPUT PARK Only	6.7L Diesel - PCM Pin C1232T-45	7.3L Gasoline – PCM Pin C175B-105
				- An output from the PCM that indicates when the Transmission Range Sensor is indicating that the Transmission is in the Park Position. The Low Side driver (160mA max.) in the PCM will pull this output to ground when active (Transmission is in the PARK Position). To properly reference this output, the customer supplied external controller/device needs to pull this output up to VPWR with a 680 Ohm resistor. Thus, when the output is active, the voltage at this output will be 0 volts. When this output is not active, the output will be pulled up to VPWR by the 680 Ohm pull up resistor.	
DIESEL GREEN / WHITE GAS GREEN / BROWN	TRO N	CET21	OUTPUT NEUTRAL Only	6.7L Diesel - TCM Pin C1232T-60	7.3L Gasoline – PCM Pin C175B-104
				- An output from the PCM that indicates when the Transmission Range Sensor is indicating that the Transmission is in the Neutral Position. The Low Side driver (160mA max.) in the PCM will pull this output to ground when active (Transmission is in the Neutral Position). To properly reference this output, the customer supplied external controller/device needs to pull this output up to VPWR with a 680 Ohm resistor. Thus, when the output is active, the voltage at this output will be 0 volts. When this output is not active, the output will be pulled up to VPWR by the 680 Ohm pull up resistor.	
GAS VIOLET / RED DIESEL VIOLET / WHITE	VS OUT	VMC05	OUTPUT Vehicle Speed	6.7L Diesel - PCM Pin C1232T-90	7.3L Gasoline – PCM Pin C175B-102
				- An output from the PCM that provides 8000 pulses per mile signal with a 50% duty cycle. The low side driver in the PCM will switch the output off and on (off will allow the output to be pulled up close to VPWR), (on will put the output to 0 volts).	
BLUE	CTO	CE913	OUTPUT Engine Speed	6.7L Diesel - PCM Pin C1232T-59	7.3L Gasoline – PCM Pin C175B-108
				- An output from the PCM that indicates a Clean Tachometer Output to provide an indication of engine RPM. The low side driver in the PCM will switch the output off and on (off will allow the output to be pulled up close to VPWR), (on will put the output to 0 volts), at a Frequency = ((Engine RPM's * Number of cylinders) / 120), with a duty cycle of 50%. The customer-supplied external controller should have a high-impedance input such that it does not impact the PCM's ability to provide a Clean Tach Out signal.	
WHITE / VIOLET	PARK BRAKE	CMC25	OUTPUT Park Brake	Hydraulic Brakes - BCM Pin C2280E-47	Air Brakes – GFM pin C2464B-9
				Ground Output Signal wire NOTE: The Body Control Module (BCM) park brake input also uses this signal. The BCM park brake input cannot source any current. The body builder must provide a high impedance circuit (such as a Field Effect Transistor) with a 20 kilo-ohm or larger resistor to prevent faulting the Body Control Module. See schematic in the Body Builder Layout Book.	

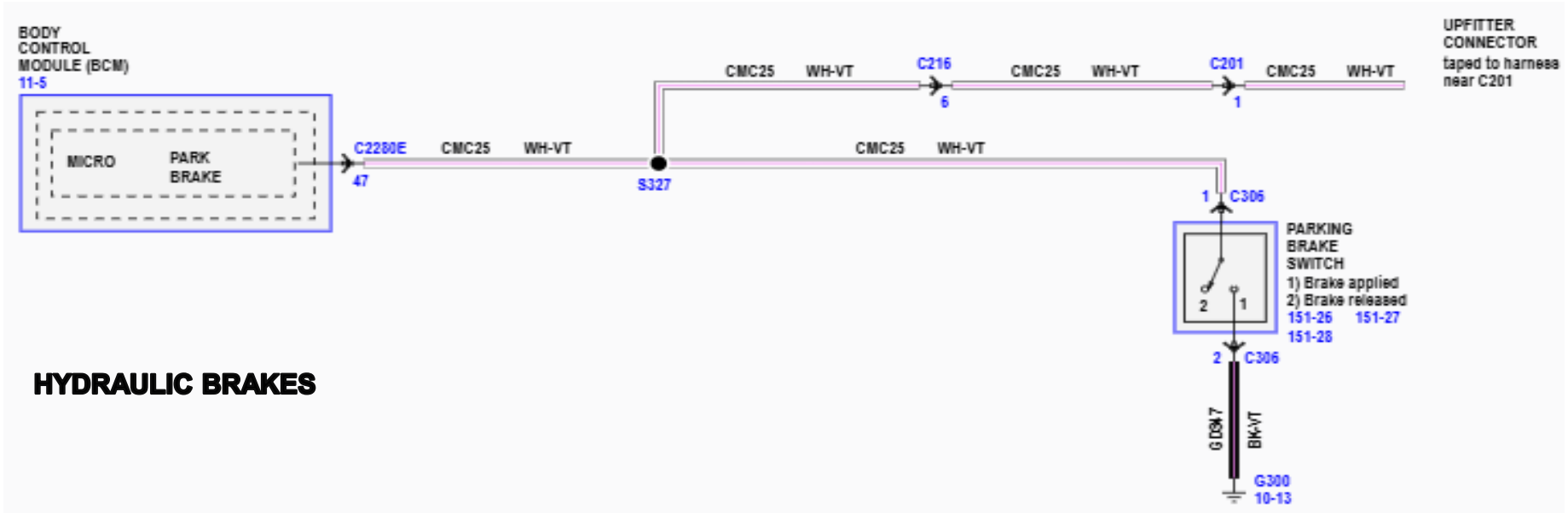
7.3L GAS & 6.7L DIESEL

BATTERY VOLTAGE SOURCES (VPWR)

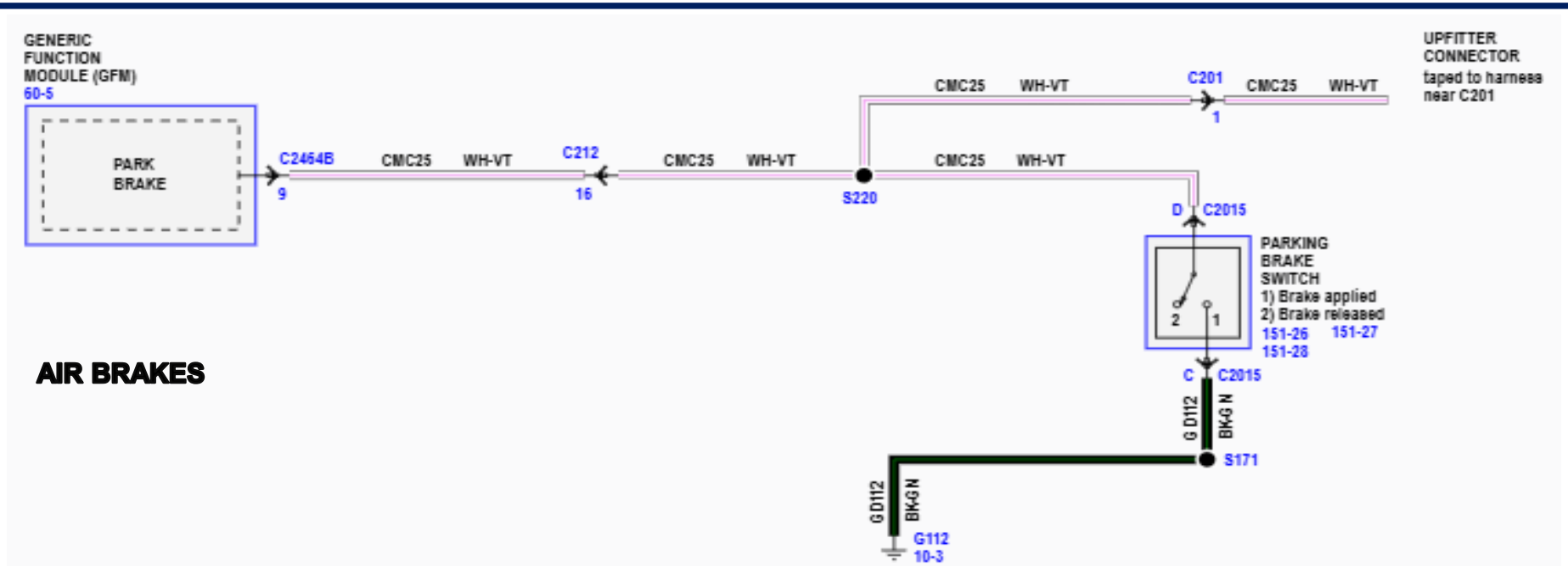
WIRE COLOR	WIRE TAG	CIRCUIT NO.	CIRCUIT INTENT	DESCRIPTION
GRAY	VPWR3	CBK03	OUTPUT RUN / START	-Ignition Hot-in Run / Start -10-amp fused (F34 in PDB) circuit, found in customer access circuit harness under driver's side dash.
YELLOW	UPFIT RLY 1	CAC05	OUTPUT Upfitter Switch 1	- 40A fused output (16awg), found in customer access circuit harness under driver's side dash.
GREEN / BROWN	UPFIT RLY 2	CAC06	OUTPUT Upfitter Switch 2	- 40A fused output (16awg), found in customer access circuit harness under driver's side dash.
VIOLET / GREEN	UPFIT RLY 3	CAC07	OUTPUT Upfitter Switch 3	- 20A fused output (20awg), found in customer access circuit harness under driver's side dash.
BROWN	UPFIT RLY 4	CAC08	OUTPUT Upfitter Switch 4	- 20A fused output (20awg), found in customer access circuit harness under driver's side dash.

MEDIUM DUTY F-650/750

ELECTRICAL: CUSTOMER ACCESS CIRCUITS – HYDRAULIC & AIR BRAKES



HYDRAULIC BRAKES



AIR BRAKES

MEDIUM DUTY F-650/750

ELECTRICAL: STATIONARY ELEVATED IDLE CONTROL

STATIONARY ELEVATED IDLE CONTROL (SEIC)

A power train control module (PCM) strategy that provides elevated engine speed to drive auxiliary commercial equipment such as hydraulic pumps, generators, air compressors; or maintain vehicle battery charge under extreme electrical demands.

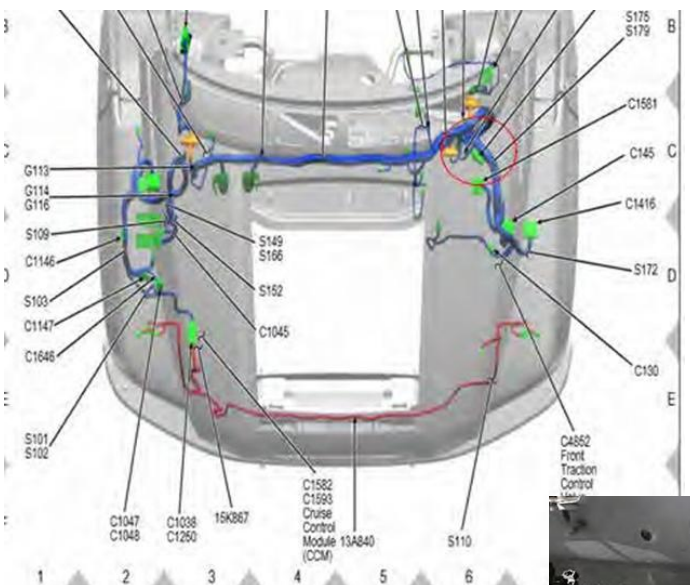
- SEIC is standard in all PCM's for F-650/750 trucks.
- 6.7L diesel only - Split shaft mode engages the transmission output shaft.

CUSTOMER ACCESS WIRES FOR SEIC AND VSO/CTO/PARK SIGNALS

- The final stage manufacturer or up-fitter is required to supply the customer interface equipment.
- Additional information in the "Circuit Descriptions" section.
- SEIC Circuits are now located underhood on the Driver's Side as shown in the picture below

CUSTOMER ACCESS CIRCUIT / SEIC WIRE LOCATIONS

SEIC circuits, Customer Access Signal Circuits.

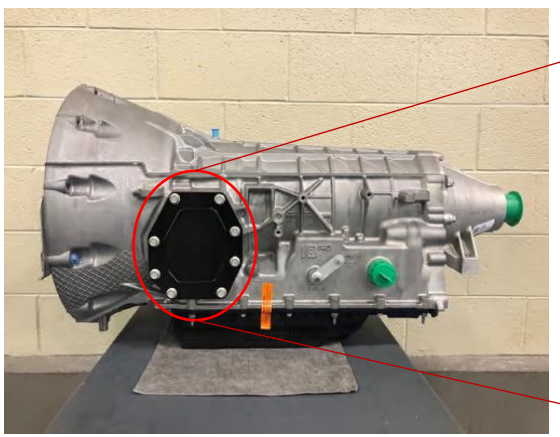


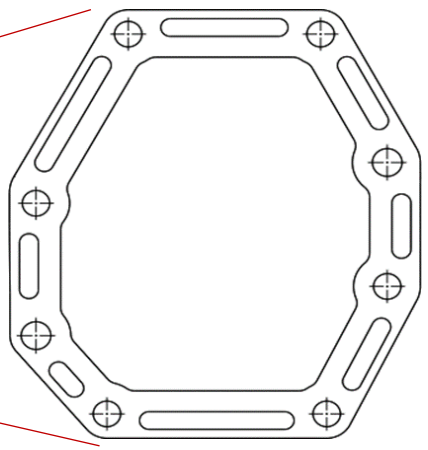
TRANSMISSION POWER TAKE OFF (PTO) GEAR AND PORT

- Available on F-650/750.
- Available for TorqShift™ 6-speed/10 speed automatic transmission by ordering “Transmission Power Take-Off Provision”. The PTO gear is direct-splined to the torque converter impeller hub.
- NEVER use any sealer, especially silicone-based, on the PTO port gasket.
- TorqShift™ Automatic Transmission provides torque to the aftermarket PTO of up to 250ft-lbs of on the 7.3L Gasoline engine. The powertrain cooling system can manage the heat of 40 HP on the 7.3L gasoline engine during continuous operation. Higher horsepower can be delivered, but for shorter durations depending on the amount of power required.
- Some aftermarket PTO’s may not be capable of using the full available torque. Consult with the aftermarket PTO supplier to ensure the appropriate PTO selected for the application.

PTO MOUTING (DIESEL)

8-Bolt Pattern





Body Builders Layout Book

MEDIUM DUTY F-650/750

SEIC / PTO: TRANSMISSION SPECIFICATION

SUBJECT	ITEM	TORQSHIFT 10-SPEED AUTOMATIC 6.7L Diesel	TORQSHIFT 6-SPEED AUTOMATIC 7.3L Gas
Transmission Fluid Type (1)		Mercon LV ATF	Mercon ULV ATF
Hydraulic Fluid Line Pressure (1)	At base engine speed (Park)		
	At base engine speed (Neutral)		
	At base engine speed (Drive)		
	PTO Enabled (Park)	200 psi	150 psi
	PTO Enabled (Neutral)	201 psi	150 psi
	PTO Enabled (Drive)	202 psi	150 psi
Transmission Gear Ratios		10-SPEED AUTOMATIC	
	1st	4.615	3.974
	2nd	2.919	2.318
	3rd	2.132	1.516
	4th	1.773	1.149
	5th	1.519	0.858
	6th	1.277	0.674
	7th	1	-
	8th	0.851	-
	9th	0.687	-
	10th	0.632	-
	Reverse	-4.695	3.128
	Torque Converter Multiplication	1.97	2
PTO Drive Gear Function	All Forward Drive Gears	Mobile Mode	Mobile Mode
	Reverse	Mobile Mode	Mobile Mode
	Overdrive	Mobile Mode	Mobile Mode
	Park	Stationary Mode\Mobile Mode	Stationary Mode - Mobile Mode
	Neutral	Stationary Mode\Mobile Mode	Stationary Mode - Mobile Mode
PTO Drive Gear Data	PTO Port	LH (Driver Side) only 8-Bolt pattern	LH (Driver Side) only SAE 6-Bolt pattern
	Gear Torque Rating	300 lb.-ft Stationary, 200 lb.-ft Mobile	250 lb.-ft Stationary,125 lb.-ft Mobile
	Gear Ratio	0.885	1
	Number of gear teeth	46	52
	Angle and Hand of Helix	RH-Spur Gear	RH-Spur Gear
	Gear RPM at 1000 Engine RPM	1130	1000
Aftermarket PTO Model Series (2)	Chelsea Technical Service (662) 895-1052, chelseatech@parker.com	Contact PTO Manufacturer	Contact PTO Manufacturer
	Muncie Power Products Technical Service 1-800-FOR-PTOS, info@munciepower.com	Contact PTO Manufacturer	Contact PTO Manufacturer
Internal Transmission Fluid Temperature Monitor		Yes	Yes

NOTE- [ ] DIMENSION ARE INCHES

ELECTRICAL: STATIONARY ELEVATED IDLE CONTROL & BATTERY CHARGE PROTECT (BCP)

PTO MODE SPECIFICATIONS

ENGINE	MODE	MAX. LOAD AT TRANSMISSION PTO GEAR	MIN. ENGINE RPM	MAX. ENGINE RPM
6.7L DIESEL	STATIONARY	300 ft-lbs	900	3000
	MOBILE	200 ft-lbs	1500	3000
	SPLIT-SHAFT	N/ A	700	3000
7.3L GASOLINE	STATIONARY	250 ft-lbs	800	2400
	MOBILE	125 ft-lbs	1500	6500

OPERATING MODES

Stationary Elevated Idle Control Mode:

Operates in Park at elevated engine speed. The maximum load at the transmission PTO gear are shown in the table below:

ENGI NE	MAX. LOAD AT TRANSMISSION PTO GEAR, STATIONARY
6.7L DIESEL	300 ft-lbs
7.3L GASOLINE	250 ft-lbs

- Intended to be commanded ONLY by applying battery voltage to certain customer-access blunt-cut wire circuits, and adding a target-speed resistor, and is only available when the vehicle road speed signal is zero
- Includes a circuit which changes from open-circuit to ground when enablers are met that may be used to turn on an indicator lamp while providing battery power to an aftermarket PTO clutch or solenoid
- Engine speed ramp-rates are configurable, by means of an IDS tool, for all powertrains.
  - Default ramp-rate for all powertrains is 200 RPM/second.
  - Configurable ramp rates are as follows:
    - Diesel: 100 – 800 RPM/sec (in 100 RPM/sec increments)
    - Gas: 100 – 1000 RPM/sec (in 100 RPM/sec increments)

Typical SEIC Engagement Sequence for TorqShift™ PTO

1. 12V is applied to PTQ REQ1 circuit.
2. PCM looks for the following enabling conditions:
   - Parking brake applied.
   - Foot off of service brake
   - Vehicle in PARK (or NEUTRAL)
   - Foot off of accelerator pedal
   - Vehicle speed is 0 mph (stationary)
   - Engine at a stable base idle speed
   - Transmission Oil Temp above 20° F
   - 6.7L only - Engine Coolant Temperature (ECT) 20° F minimum
   - 7.3L only - Engine Coolant Temperature (ECT) 20° F minimum.
3. Command is sent to boost the transmission hydraulic line pressure to a minimum of 150 psi, which is used by the aftermarket PTO supplier to hold their PTO Clutch. Command is sent to increase engine speed to 900 rpm
4. The PTO RLY circuit changes from open-circuit to ground. If the up-fitter uses the circuit wiring offered in this bulletin, then this will provide battery voltage to the aftermarket PTO solenoid to engage the PTO.
5. Engine RPM ramps to target speed determined by the resistor selection.

Mobile Mode

Operates in all gears and all vehicle speeds. The engine idle speed is elevated to 750 RPM when the Mobile Mode is initiated.

Engine RPM is controlled by the driver through the throttle pedal and is limited to upfitter selected peak engine speed - RPM Limiting (RPM limiting controls engine speed in Mobile Mode below a selectable maximum threshold. Maximum RPM is determined by the resistor installed between the PTO_REF and PTO RPM circuits.
See table for RPM / resistor values.

- Transmission behavior changes in Mobile Mode due to upshifting performance; e.g., it is possible for a customer to reach max. rpm in a lower gear, and the transmission is unable to accelerate – or upshift – to the next gear.
- If this action is not desired, the operator can:
  1. Ease up on the accelerator pedal and receive an upshift, or
  2. Put the transmission in manual mode and select the gears manually
- Selected target RPM has a margin of +/- 15% based on transient conditions (for example, descending a grade).
- Mobile PTO may overshoot selected the RPM by 100-200 RPM f or drivability
- **Limiting the maximum engine speed in mobile PTO below 1500 RPM is not recommended. Possible issues include difficulty climbing grades, engine lugging, inconsistent transmission shifting, and poor transmission shift quality.**

The Maximum load allowable for mobile mode are shown in the table below.

ENGI NE	MAX. LOAD AT TRANSMISSION PTO GEAR, MOBILE MODE
6.7L DIESEL	200 ft-lbs
7.3L GASOLINE	125 ft-lbs

- If the PTO feature is used for extended periods of time without vehicle movement, it is recommended to switch to Stationary Mode

Typical Mobile Mode Engagement Sequence

1. 12V applied to PTO REQ2 circuit
2. PCM looks for the following enabling conditions:
   - Transmission Oil Temp above 20° F
   - 6.7L only - Engine Coolant Temperature (ECT) 20° F minimum
   - 7.3L only - Engine Coolant Temperature (ECT) 20° F minimum
3. PCM looks for voltage on PTO RPM circuit
4. Command is sent to boost transmission hydraulic line pressure to a minimum of 150 psi, which is used by the aftermarket PTO supplier to hold their PTO Clutch
5. The PTO RLY circuit changes from open-circuit to ground. If the up-fitter uses the circuit wiring offered in this bulletin, then this will provide battery voltage to the aftermarket PTO solenoid to engage the PTO.
6. Engine idle increases to 750 RPM.

Split Shaft Mode (Diesel Only)

To install Split-Shaft mode, wire according to the diagram. Select elevated idle speed by installing a resistor (which provides voltage to PTO RPM input) as indicated in the wiring diagram. Split-Shaft mode requires that supply voltage (nominal 12vdc) be applied to both the PTO REQ1 and PTO REQ2 circuits.

Split Shaft Engagement Procedure:

1. Ensure the following engine is running and the engine coolant temp is above 20° F
2. Apply park brake
3. Disconnect vehicle drive train (transmission in NEUTRAL, 4x4 DISENGAGED) and engage PTO load
4. With foot off both the service brake and accelerator pedals, turn Split-Shaft PTO on, Engine speed will lift to approx. 650 RPM stand-by speed.
5. While pressing the service brake, shift transmission into drive, Brake pedal must remain depressed for a minimum of 3 seconds after moving gear shift lever into drive position in order to enable Split-Shaft Mode
6. The system will raise transmission hydraulic line pressure, shift into 7th gear, and lock the converter (keep service brake depressed minimum of three seconds after transition into drive). Release service brake and engine speed will ramp up to target idle speed in a controlled manner.

If vehicle unexpectedly lurches or moves upon releasing service brake, immediately depress brake pedal and shift transmission into PARK or NEUTRAL to secure vehicle. Contact Upfitter immediately.

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ELECTRICAL: STATIONARY ELEVATED IDLE CONTROL & BATTERY CHARGE PROTECT (BCP)

Battery Charge Protect (BCP):

When 12V is applied to the BCP SW circuit, the engine speed goes immediately to 600. From this state, the PCM uses battery voltage as well as ambient air temp., engine oil temperature information to raise engine speed higher to maintain battery charge. Maximum engine speed in BCP mode is 1200 rpm. Loss of an operating condition after BCP is engaged will require the BCP switch to be cycled before BCP will re-engage.

- **BCP CANNOT BE ACTIVE WHEN SEIC OR PTO MODES ARE ACTIVE**
- A Resistor must be installed between PTO REF and PTO RPM for both Diesel and Gasoline engines.

Typical Battery Charge Protect Mode Engagement Sequence:

1. 12V applied to BCP SW circuit
2. PCM looks for the following enabling conditions:
   - Parking brake applied.
   - Foot off of service brake
   - Vehicle in PARK (or NEURTRAL)
   - Foot off of accelerator pedal
   - Vehicle speed is 0 mph (stationary)
   - Engine at a stable base idle speed
   - Transmission Oil Temp above 20° F
   - 6.7L only - Engine Coolant Temperature (ECT) 20° F minimum
   - 7.3L only - Engine Coolant Temperature (ECT) 20° F minimum.
3. PCM looks for a valid voltage between 0.2 to 4.7 Volts on the PTO RPM circuit
4. Vehicle idle fluctuates slightly as PCM enters BCP mode
5. The BCP LP circuit changes from open-circuit to ground. This is intended to provide a ground path for a BCP indicator lamp

NOTE: BCP is a smart system. Engine idle will not increase unless the vehicle senses an increase in electrical demand. Under periods of low electrical demand, the operator may not notice any change in engine RPM. It is recommended that the modifier install an indicator lamp to alert the operator that BCP is properly engaged.

ADDITIONAL NOTES:

Adaptive Cooling

This PCM strategy automatically restricts engine power when it senses an over-temperature condition and may interrupt the SEIC-PTO operation. Typically, the over temperature condition it reacts to will also show up on the temperature gage on the instrument panel. Elevated engine speed, typical of SEIC operation, may help avoid Adaptive Cooling occurrence due to the resultant additional engine and transmission coolant flow. However, depending on the auxiliary PTO power being demanded, 900 rpm may not be enough to prevent the power train from entering Adaptive Cooling mode, but 1500 rpm may.

Input Resistor

ALL modes (SEIC, PTO) require usage of an input resistor.

The resistor value may be obtained in Tables A & B.

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SEIC / PTO RESISTOR TABLES 0.10 VOLTAGE INCREMENTS – GAS & DIESEL

			GAS			DIESEL			
			SEIC PTO	Mobile PTO	Mobile PTO	SEIC PTO	Split Shaft PTO	Mobile PTO	Mobile PTO
	PTO_RPM Input Voltage	Resistor Ω	Engine RPM	Engine RPM Speed Limit	Engine Base Idle Speed (Minimum)	Engine RPM	Engine RPM	Engine RPM Speed Limit	Engine Base Idle Speed (Minimum)
Voltage Out-Of-Range LOW	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	0.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	0.20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Voltage Dead Band	0.30	73,633	700	900	750	900	700	900	750
Usable Voltage Range	0.40	54,050	700	900	750	900	700	900	750
	0.50	42,300	743	1,040	750	953	758	953	750
	0.60	34,467	785	1,180	750	1,005	815	1,005	750
	0.70	28,871	828	1,320	750	1,058	873	1,058	750
	0.80	24,675	870	1,460	750	1,110	930	1,110	750
	0.90	21,411	913	1,600	750	1,163	988	1,163	750
	1.00	18,800	955	1,740	750	1,215	1,045	1,215	750
	1.10	16,664	998	1,880	750	1,268	1,103	1,268	750
	1.20	14,883	1,040	2,020	750	1,320	1,160	1,320	750
	1.30	13,377	1,083	2,160	750	1,373	1,218	1,373	750
	1.40	12,086	1,125	2,300	750	1,425	1,275	1,425	750
	1.50	10,967	1,168	2,440	750	1,478	1,333	1,478	750
	1.60	9,988	1,210	2,580	750	1,530	1,390	1,530	750
	1.70	9,124	1,253	2,720	750	1,583	1,448	1,583	750
	1.80	8,356	1,295	2,860	750	1,635	1,505	1,635	750
	1.90	7,668	1,338	3,000	750	1,688	1,563	1,688	750
	2.00	7,050	1,380	3,140	750	1,740	1,620	1,740	750
	2.10	6,490	1,423	3,280	750	1,793	1,678	1,793	750
	2.20	5,982	1,465	3,420	750	1,845	1,735	1,845	750
	2.30	5,517	1,508	3,560	750	1,898	1,793	1,898	750
	2.40	5,092	1,550	3,700	750	1,950	1,850	1,950	750
	2.50	4,700	1,593	3,840	750	2,003	1,908	2,003	750
	2.60	4,338	1,635	3,980	750	2,055	1,965	2,055	750
	2.70	4,004	1,678	4,120	750	2,108	2,023	2,108	750
	2.80	3,693	1,720	4,260	750	2,160	2,080	2,160	750
	2.90	3,403	1,763	4,400	750	2,213	2,138	2,213	750
	3.00	3,133	1,805	4,540	750	2,265	2,195	2,265	750
	3.10	2,881	1,848	4,680	750	2,318	2,253	2,318	750
	3.20	2,644	1,890	4,820	750	2,370	2,310	2,370	750
	3.30	2,421	1,933	4,960	750	2,423	2,368	2,423	750
	3.40	2,212	1,975	5,100	750	2,475	2,425	2,475	750
	3.50	2,014	2,018	5,240	750	2,528	2,483	2,528	750
	3.60	1,828	2,060	5,380	750	2,580	2,540	2,580	750
	3.70	1,651	2,103	5,520	750	2,633	2,598	2,633	750
	3.80	1,484	2,145	5,660	750	2,685	2,655	2,685	750
	3.90	1,326	2,188	5,800	750	2,738	2,713	2,738	750
	4.00	1,175	2,230	5,940	750	2,790	2,770	2,790	750
	4.10	1,032	2,273	6,080	750	2,843	2,828	2,843	750
	4.20	895	2,315	6,220	750	2,895	2,885	2,895	750
	4.30	765	2,358	6,360	750	2,948	2,943	2,948	750
	4.40	641	2,400	6,500	750	3,000	3,000	3,000	750
Voltage Dead Band	4.50	522	2,400	6,500	750	3,000	3,000	10,000	750
	4.60	409	2,400	6,500	750	3,000	3,000	10,000	750
Voltage Out-Of-Range HIGH	4.70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4.80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4.90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	5.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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SEIC / PTO RESISTOR TABLES 100-RPM INCREMENTS – GAS & DIESEL

6.7L DIESEL NON-SPLIT SHAFT STATIONARY

ENGINE TARGET	RESISTOR	VOLTAGE
900	54,050	0.40
1,000	35,098	0.59
1,100	25,391	0.78
1,200	19,491	0.97
1,300	15,525	1.16
1,400	12,677	1.35
1,500	10,531	1.54
1,600	8,858	1.73
1,700	7,515	1.92
1,800	6,415	2.11
1,900	5,496	2.30
2,000	4,718	2.50
2,100	4,050	2.69
2,200	3,471	2.88
2,300	2,963	3.07
2,400	2,515	3.26
2,500	2,116	3.45
2,600	1,759	3.64
2,700	1,438	3.83
2,800	1,147	4.02
2,900	883	4.21
3,000	641	4.40

7.3L GAS NON-SPLIT SHAFT STATIONARY

ENGINE TARGET	RESISTOR	VOLTAGE
700	54,050	0.40
800	32,291	0.64
900	22,293	0.87
1,000	16,550	1.11
1,100	12,822	1.34
1,200	10,207	1.58
1,300	8,271	1.81
1,400	6,780	2.05
1,500	5,596	2.28
1,600	4,634	2.52
1,700	3,836	2.75
1,800	3,164	2.99
1,900	2,590	3.22
2,000	2,094	3.46
2,100	1,661	3.69
2,200	1,281	3.93
2,300	943	4.16
2,400	641	4.40

6.7L DIESEL SPLIT SHAFT STATIONARY ELEVATED

ENGINE TARGET	RESISTOR	VOLTAGE
700	54,050	0.40
800	36,247	0.57
900	26,724	0.75
1,000	20,795	0.92
1,100	16,748	1.10
1,200	13,810	1.27
1,300	11,580	1.44
1,400	9,830	1.62
1,500	8,419	1.79
1,600	7,258	1.97
1,700	6,286	2.14
1,800	5,460	2.31
1,900	4,749	2.49
2,000	4,132	2.66
2,100	3,590	2.83
2,200	3,111	3.01
2,300	2,684	3.18
2,400	2,301	3.36
2,500	1,956	3.53
2,600	1,644	3.70
2,700	1,359	3.88
2,800	1,099	4.05
2,900	861	4.23
3,000	641	4.40

6.7L DIESEL MOBILE PTO ENGINE SPEED LIMIT

ENGINE TARGET	RESISTOR	VOLTAGE
900	54,050	0.40
1,000	35,098	0.59
1,100	25,391	0.78
1,200	19,491	0.97
1,300	15,525	1.16
1,400	12,677	1.35
1,500	10,531	1.54
1,600	8,858	1.73
1,700	7,515	1.92
1,800	6,415	2.11
1,900	5,496	2.30
2,000	4,718	2.50
2,100	4,050	2.69
2,200	3,471	2.88
2,300	2,963	3.07
2,400	2,515	3.26
2,500	2,116	3.45
2,600	1,759	3.64
2,700	1,438	3.83
2,800	1,147	4.02
2,900	883	4.21
3,000	641	4.40

7.3L GAS MOBILE PTO ENGINE SPEED LIMIT

ENGINE TARGET	RESISTOR	VOLTAGE
900	54,050	0.40
1,000	45,148	0.47
1,100	38,589	0.54
1,200	33,556	0.61
1,300	29,571	0.69
1,400	26,338	0.76
1,500	23,662	0.83
1,600	21,411	0.90
1,700	19,491	0.97
1,800	17,834	1.04
1,900	16,390	1.11
2,000	15,119	1.19
2,100	13,993	1.26
2,200	12,988	1.33
2,300	12,086	1.40
2,400	11,271	1.47
2,500	10,531	1.54
2,600	9,858	1.61
2,700	9,241	1.69
2,800	8,674	1.76
2,900	8,152	1.83
3,000	7,668	1.90
3,100	7,220	1.97
3,200	6,803	2.04
3,300	6,415	2.11
3,400	6,052	2.19
3,500	5,711	2.26
3,600	5,392	2.33
3,700	5,092	2.40
3,800	4,809	2.47
3,900	4,542	2.54
4,000	4,289	2.61
4,100	4,050	2.69
4,200	3,823	2.76
4,300	3,608	2.83
4,400	3,403	2.90
4,500	3,209	2.97
4,600	3,023	3.04
4,700	2,846	3.11
4,800	2,677	3.19
4,900	2,515	3.26
5,000	2,360	3.33
5,100	2,212	3.40
5,200	2,070	3.47
5,300	1,933	3.54
5,400	1,802	3.61
5,500	1,676	3.69
5,600	1,555	3.76
5,700	1,438	3.83
5,800	1,326	3.90
5,900	1,217	3.97
6,000	1,113	4.04
6,100	1,012	4.11
6,200	914	4.19
6,300	820	4.26
6,400	729	4.33
6,500	641	4.40

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SEIC /PTO: PTO MODES CIRCUIT DESCRIPTIONS (GAS & DIESEL)

6.7L DIESEL ENGINE PCM

WIRE COLOR	WIRE TAG	CIRCUIT NO.	CIRCUIT INTENT	DESCRIPTION
YELLOW / GREEN	PTOREQ1	CE912	INPUT (VPWR)	**6.7L Diesel - PCM PIN C1232T- 64** •Applying vehicle battery voltage to this wire initiates SEIC Stationary Mode process. •Signals TorqShift™ transmission to enter SEIC Stationary Mode strategy. •Verifies safety enablers. •Turns off OBD and other emission-related monitoring. •Elevates engine speed to target found at PTO-RPM circuit. •Invokes the PTO relay circuit when safety enablers are met. •Looks for the target engine speed requested at the PTO_RPM circuit using a resistor or POT.
BLUE / ORANGE	PTOREQ2	CE933	INPUT (VPWR)	**6.7L Diesel - PCM PIN C1232T- 49** •Applying vehicle battery voltage to t this wire initiates Mobile PTO Mode. •Signals TorqShift™ transmission to enter Mobile Mode strategy. •Verifies safety enablers. •Turns off OBD and other emission-related monitoring. •Invokes the PTO relay circuit when safety enablers are met. •Requires valid resistance on PTO_RPM input for system to function
BLUE / WHITE	PTORLY	CE326	OUTPUT	**6.7L Diesel - PCM PIN C1232T-30** •A low-side driver, changing from "open-circuit" to "ground" indicating that the engine is ready for the PTO operation to begin and that a PTO load may be applied. •Intended for powering a PTO indicator lamp, or turn on a relay coil (not to exceed 1 amp).LED lights require adding a resistor in series.
GREEN	PTORPM	CE914	INPUT (RESISTOR)	**6.7L Diesel - PCM PIN C1232T- 84** •Requires the addition of a resistor or potentiometer for any SEIC / PTO mode. •Resistor / potentiometer selection determines the fixed or variable engine target speed. •Combine in circuit with PTO-VREF and PTO-GND. •Speed range available: 900 rpm to 3000 rpm (700 min RPM for split shaft operation).
WHITE / BROWN	PTOREF	LE434	REFERENCE VOLTAGE	**6.7L Diesel - PCM PIN C1232T- 83** •A 5-volt reference, buffered against shorts to ground or power, used to complete the resistor circuit for engine speed selection.
GRAY / RED	PTORTN	RE327	PCM GROUND	**6.7L Diesel - PCM PIN C1232T- 85** •A ground reference, buffered, used to complete the resistor circuit for engine speed selection.
VIOLET / BROWN	BCP SW	CE926	INPUT (VPWR)	**6.7L Diesel - PCM PIN C1232T- 19** •Applying vehicle battery voltage to this wire begins BCP. •BCP regulates engine speed between 600 to1200 rpm to maintain required charge system voltage
BROWN	BCP LP	CE140	OUTPUT	**6.7L Diesel - PCM PIN C1232T- 75** •A low-side driver, changing from "open-circuit" to "ground" indicating that BCP is in effect. •Intended for powering an indicator lamp.

7.3L GAS ENGINE PCM

WIRE COLOR	WIR TAG	CIRCUIT NO.	CIRCUIT INTENT	DESCRIPTION
YELLOW / GREEN	PTOREQ1	CE912	INPUT (VPWR)	**PCM PIN C175B-30** •Applying vehicle battery voltage to this wire initiates SEIC Stationary Mode process. •Signals TorqShift™ transmission to enter SEIC Stationary Mode strategy. •Verifies safety enablers. •Turns off OBD and other emission-related monitoring. •Elevates engine speed to target found at PTO-RPM circuit. •Invokes the PTO relay circuit when safety enablers are met. •Looks for the target engine speed requested at the PTO_RPM circuit using a resistor or POT
BLUE / ORN	PTOREQ2	CE933	INPUT (VPWR)	**PCM PIN C175B-54** •Applying vehicle battery voltage to this wire initiates Mobile PTO Mode. •Signals TorqShift™ transmission to enter Mobile mode strategy. •Verifies safety enablers. •Turns off OBD and other emission-related monitoring. •Invokes the PTO relay circuit when safety enablers are met. •Requires valid resistance on PTO_RPM input for system to function
BLUE / RED	PTORLY	CE326	OUTPUT	**PCM PIN C175B-79** •A low-side driver, changing from "open-circuit" to "ground" indicating that the engine is ready for PTO operation to begin and that a PTO load may be applied. •Intended for powering a PTO indicator lamp, or turn on a relay coil (not to exceed 1 amp).LED lights require adding a resistor in series.
GREEN / ORANGE	PTORPM	CE914	INPUT (RESISTOR)	**PCM PIN C175B-88** •Requires the addition of a resistor or potentiometer for any SEIC / PTO mode. •Resistor / potentiometer selection determines the fixed or variable engine target speed. •Combine in circuit with PTO_VREF (+5VDC). •Speed range available: 910 rpm to 2400 rpm
YELLOW / GREEN	PTO VREF	LE424	REFERENCE VOLTAGE	**PCM PIN C175B-118** •A +5-volt reference, buffered against shorts to ground or power, used to complete the resistor circuit for engine speed selection.
YELLOW / VIOLET	SIGRTN_C	RE407	PCM GROUND	**PCM PIN C175B-97** •A ground reference, buffered, used to complete the resistor circuit for engine speed selection.
VIOLET / BROWN	BCP SW	CE926	INPUT (VPWR)	**PCM PIN C175B-52** •Applying vehicle battery voltage to this wire begins BCP. •BCP regulates engine speed between 600 to1200 rpm to maintain required charge system voltage
BROWN	BCPIL	CE140	OUTPUT	**PCM PIN C175B-86** •A low-side driver, changing from "open-circuit" to "ground" indicating that BCP is in effect. •Intended for powering an LED lamp (40mA max.).

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SEIC /PTO: SEIC /MOBILE MODE/SPLIT-SHAFT/ BCP CONDITONS (GAS & DIESEL)

VEHICLE CONDITIONS TO ENABLE SEIC (ALL ARE REQUIRED)	VEHICLE CONDITIONS THAT DISABLE SEIC (ANY ONE REQUIRED - SEE NOTE-1)	SEIC	SPLIT SHAFT (DIESEL ONLY)	MOBILE MODE	BCP
Parking Brake Applied.	Parking Brake Disengaged.	Yes	Yes	No	Yes
Foot Off Of Service Brake	Depressing Service Brake	Yes	See note 4	No	Yes
Vehicle In PARK (Or NEUTRAL)	Vehicle Take Out Of PARK (Or NEUTRAL)	Yes	See note 4	No	Yes
Foot Off Of Accelerator Pedal	Accelerator Pedal Depressed	Yes	Yes	No	Yes
Vehicle Speed Is 0 Mph (Stationary)	Vehicle Speed Is Not 0 Mph (Stationary)	Yes	Yes	No	Yes
Engine At A Stable Base Idle Speed		Yes	Yes	No	Yes
Transmission Oil Temp Above 20°F	Transmission Oil Temperature (TOT) Exceeds 240°F.	Yes	Yes	Yes	Yes
Engine Coolant Temperature (ECT) 20°F Minimum (6.7l)	Engine Coolant Temperature (ECT) Exceeds 230° F	Yes	Yes	Yes	No
Engine Coolant Temperature (ECT) 20°F Minimum. (7.3l)	Engine Coolant Temperature Limit (ECT) 230° F Maximum	Yes	N/A	Yes	Yes
	Catalyst Temperature Limit	Yes	Yes	Yes	Yes

- **NOTE 1:** A “Change-of-state” at the “PTO REQ1” input (for Stationary Elevated Idle Control non-Split Shaft), or for both “PTO REQ1 and PTO REQ2” inputs (for Stationary Elevated Idle Control Split Shaft) is required to re-invoke Stationary Elevated Idle Control. When a disable is seen by the PCM, the Stationary Elevated Idle Control function is de-activated, the “PTO RELAY” output circuit changes from a “ground- source” to “open-circuit”, and engine speed returns to base idle. To re-activate Stationary Elevated Idle Control, the operator must open the PTO Switch to the “PTO REQ1” and “PTO REQ2” inputs, then close the PTO Switch again to the “PTO REQ1” or “PTO REQ1 and PTO REQ2” inputs.
- **NOTE 2:** A “change-of-state” at the “PTO REQ2” input is required to re-invoke Mobile PTO. When a disable is seen by the PCM, the Mobile PTO function is de-activated, the “PTO RELAY” output circuit changes from a “ground-source” to “open-circuit”, and engine speed returns to base idle. To re-activate Mobile PTO, the operator must open the PTO Switch to the “PTO REQ2” input, then close the PTO Switch again to the “PTO REQ2” input.
- **NOTE 3:** A “change-of-state” at the “BCP SW” input is required to re-invoke Battery Charge Protect. When a disable is seen by the PCM, the Battery Charge Protect function is de-activated, the “BCP LP” output circuit changes from a “ground-source” to “open-circuit”, and engine speed returns to base idle. To re-activate Battery Charge Protect, the operator must open the Battery Charge Protect Switch to the “BCP SW” input, then close the Battery Charge Protect Switch again to the “BCP SW” input.
- **NOTE 4:** See Split-Shaft Mode Description

SEIC / PTO – GENERAL SYSTEM BEHAVIOR

- To guarantee full advertised torque capability at the automatic transmission PTO gear and through the aftermarket PTO clutch, the hydraulic line pressure serving the aftermarket PTO clutch must be elevated. Applying battery voltage to the PTO circuit is the signal to the transmission to enter SEIC strategy and these important functions. This applies to both stationary and mobile PTO operations.
- **If an SEIC disabler occurs in any mode:**
  - **ALL engines will require a "change-of-state", meaning the operator is required to turn off voltage to the “PTO-Request” circuit, and back on again to re-invoke SEIC and PTO operation.**
- If the Transmission Oil Temperature (TOT) sensor reaches 240°F, the PTO system may disengage, preventing torque from being delivered to the aftermarket transmission PTO.
- SEIC/PTO strategy function in the PCM is not affected by the loss of vehicle battery electrical power.
- Engine speed ramp-rates are configurable, by means of an IDS tool, for all powertrains.
  - Default ramp-rate for all powertrains is 200 RPM/second.
  - Configurable ramp rates are as follows:
    - Diesel: 100 – 800 RPM/sec (in 100 RPM/sec increments)
    - Gas: 100 – 1000 RPM/sec (in 100 RPM/sec increments)
- The SEIC system offers buffered PCM voltage and ground circuits to complete the resistor circuits for engine speed.
- **Correlation between engine speed and resistor values**:
  - Both the 6.7L Diesel and 7.3L Gasoline applications uses a 5-volt reference signal and ground for the PTO_RPM input circuit.
  - Normal base engine calibration allows approximately +/-50 rpm fluctuation. If any factory vehicle accessories are used during SEIC, e.g., a/c, defroster, etc., then that fluctuation may increase to approximately +/-100 rpm or more.
  - The sudden loss of aftermarket PTO hydraulic pressure during SEIC/PTO operation, like a ruptured hose, may send SEIC engine speed to near 3000 rpm. It is recommended that a hydraulic pressure switch linked to SEIC/PTO be added to disable SEIC/PTO when a hose ruptures.
  - Because of a service brake circuit characteristic at engine-start, invoking SEIC may cause the diagnostic error code FFG_BOO to get flagged (recorded in the PCM). To avoid this, simply tap the service brake pedal sometime after engine-start and prior to invoking SEIC. Once the code is set, SEIC may not be available until it is erased.

VOCABULARY / DEFINITIONS

- **PTO Applications**: Includes all forms of mechanical power, using the vehicle powertrain as the source, including transmission side-mounted PTO, split-shaft PTO, crankshaft PTO, and FEAD-mounted clutch-pumps, air compressors, and generators.
- **Clutch-Pump:** A type of PTO that is driven by the vehicle engine crankshaft through the FEAD pulley system.
- **PCM:** Powertrain Control Module
- **FEAD**: Front End Accessory Drive (belt and pulley drive system)
- **SEIC**: Stationary Elevated Idle Control
- **VSO, VSOUT:** Vehicle Speed Out – see Customer Accessible Signal Description
- **TPO:** Throttle Position Out. Direct customer access not provided.
- **ETC:** Engine Coolant Temperature
- **CTO:** Clean Tach Out - Customer Accessible Signal Description
- **VPWR:** Vehicle Power Battery Voltage.
- **BCP_IL / BCP_SW:** Battery Charge Protection Illumination Lamp / Battery Charge Protection Switch
- **Intermittent Duty Usage:** 5 minutes out of a 15-minute period or less of continuous operation.
- **Continuous Duty Usage:** Greater than 5-minutes out of a 15-minute period of continuous operation.
- **Change-of-State:** Part of the SEIC strategy. If any condition is met that disables SEIC, the operator is required to turn the PTO switch OFF and back ON again before SEIC will allow elevated idle to return.
- **TRO_N, TRO_P:** Transmission Range Output, indicating NEUTRAL ONLY, or PARK-ONLY
- **BCM:** Body Control Module, located at lower passenger-side of instrument panel

MEDIUM DUTY F-650/750

SEIC /PTO: CONFIGURABLE SEIC ENGINE SPEEDS (GAS) - SAMPLE SCHEMATICS

SAMPLE PROCEDURE: Three-speed SEIC (1300, 1800 and 2400 RPM) with 2 switches

SCENARIO 1 (2400 RPM): Choose a resistor for the highest of the three desired speeds, 2400 RPM in this example, which requires a 641-Ohm resistor (per the resistor tables). This will be referred to as R3. When Switch 2 is closed, the total resistance between PTO_VREF and PTO_RPM is R3 = 641 Ohms.
R3 = 641 Ohms.

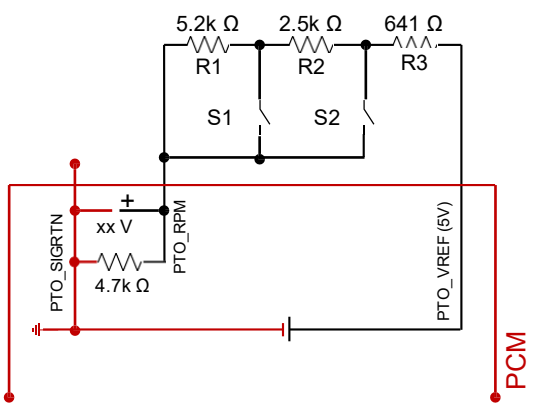
With switch 1 closed or open and switch 2 closed, the total resistance between PTO_VREF and PTO_RPM is R3 = 641 Ohms, resulting in 4.4 Volts between PTO_RPM and PTO_SIGRTN, resulting in 2400 RPM's.

SCENARIO 2 (1800 RPM): Choose a resistor for the middle speed, 1800 RPM in this case, which requires a total resistance between PTO_VREF and PTO_RPM of 3133 Ohms. When Switch 1 is closed, the total resistance between PTO_VREF and PTO_RPM needs to be 3133 Ohms (per the resistor tables), which is the sum of R3 and R2. Switch 2 must be open in this scenario.
Since R3 + R2 = 3133 Ohms,
R2 = 3133 Ohms – R3
R2 = 3133 Ohms - 641 Ohms
R2 = 2492 Ohms

With switch 1 closed and switch 2 open, the total resistance between PTO_VREF and PTO_RPM is R3+R2 = 3133 Ohms, resulting in 3.0 Volts between PTO_RPM and PTO_SIGRTN, resulting in 1800 RPM's (1805 RPMs to be exact).

SCENARIO 3 (1300 RPM): Choose a resistor for the lowest of the three speeds, 1300 RPM in this case, which requires a total resistance between PTO_VREF and PTO_RPM of 8356 Ohms (per the resistor tables). When switch 1 and switch 2 are both open, the total resistance between PTO_VREF and PTO_RPM needs to be 8356 Ohms, which is the sum of R1, R2 and R3.
Since R1 + R2 + R3 = 8356 Ohms,
R1 = 8356 Ohms – R2 – R3
R1 = 8356 Ohms - 2942 Ohms - 641 Ohms
R1 = 5223 Ohms

With switch 1 and switch 2 both open, the total resistance between PTO_VREF and PTO_RPM is R1+R2+R3 = 8356 Ohms, resulting in 1.8 Volts between PTO_RPM and PTO_SIGRTN, resulting in 1300 RPMs (1295 RPM to be exact).



SAMPLE PROCEDURE: Three-speed SEIC (1300, 1800 and 2400 RPM) with 3 -position switch

SCENARIO 1 (2400 RPM): Choose a resistor for the highest of the three desired speeds, 2400 RPM in this example, which requires a 641-Ohm resistor (per the resistor tables). This will be referred to as R3. When the switch is in Position 3, the total resistance between PTO_VREF and PTO_RPM is R3 = 641 Ohms.
R3 = 641 Ohms.

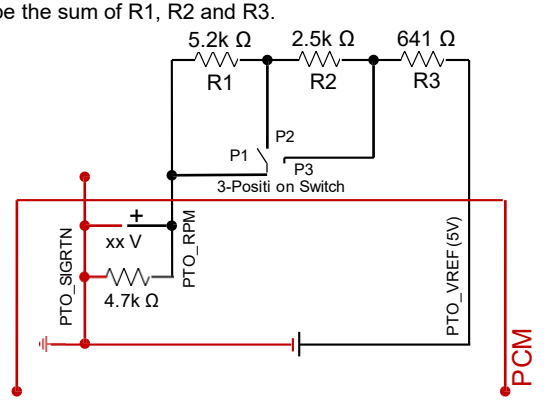
When the switch is in Position 3, the total resistance between PTO_VREF and PTO_RPM is R3 = 641 Ohms, resulting in 4.4 Volts between PTO_RPM and PTO_SIGRTN, resulting in 2400 RPM.
Note that in Position 3, the measured resistance across R1 and R2 is zero Ohms, thus the total resistance between PTO_VREF and PTO_RPM is R3.

SCENARIO 2 (1800 RPM): Choose a resistor for the middle speed, 1800 RPM in this case, which requires a total resistance between PTO_VREF and PTO_RPM of 3133 Ohms (per the resistor tables). So, when the switch is in Position 2, the total resistance between PTO_VREF and PTO_RPM needs to be 3133 Ohms, which is the sum of R2 and R3.
Since R2 + R3 = 3133 Ohms,
R2 = 3133 Ohms – R3
R2 = 3133 Ohms - 641 Ohms
R2 = 2492 Ohms

When the switch is in Position 2, the total resistance between PTO_VREF and PTO_RPM is R3 + R2 = 3133 Ohms, resulting in 3.0 Volts between PTO_RPM and PTO_SIGRTN, resulting in 1805 RPM (~1800).
Note that in Position 2, the measured resistance across R1 is zero Ohms, thus the total resistance between PTO_VREF and PTO_RPM is the sum of R2 and R3.

SCENARIO 3 (1300 RPM): Choose a resistor for the lowest of the three speeds, 1300 RPM in this case, which requires a total resistance between PTO_VREF and PTO_RPM of 8356 Ohms (per the resistor tables). So, when the switch is in Position 1, the total resistance between PTO_VREF and PTO_RPM needs to be 8356 Ohms, which is the sum of R1, R2 and R3.
Since R1 + R2 + R3 = 8356 Ohms,
R1 = 8356 Ohms – R2 – R3
R1 = 8356 Ohms - 2942 Ohms - 641 Ohms
R1 = 5223 Ohms

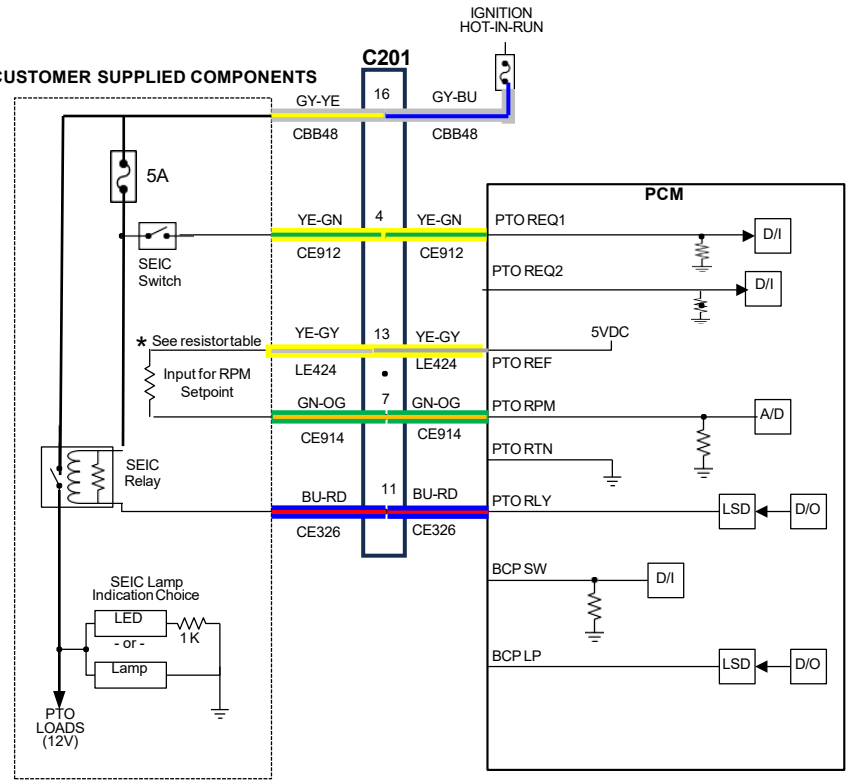
When the 3-position switch is in Position 1 , the total resistance between PTO_VREF and PTO_RPM is 8356 Ohms, resulting in 1.8 Volts between PTO_RPM and PTO_SIGRTN, resulting in 1295 RPM (~1300).
Note that switch Position 1 is not connected to anything, where this allows for the total resistance between PTO_VREF and PTO_RPM to be the sum of R1, R2 and R3.

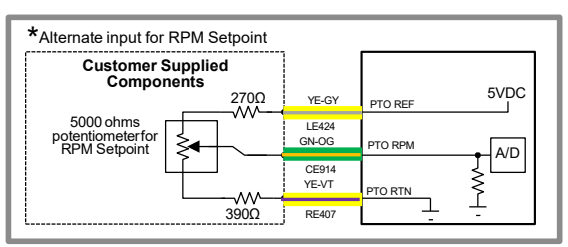


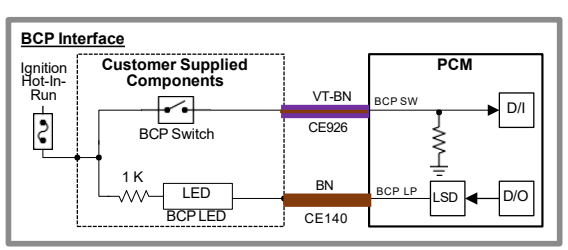
MEDIUM DUTY F-650/750

SEIC /PTO: SEIC & BCP INTERFACE SCHEMATICS (GAS & DIESEL)

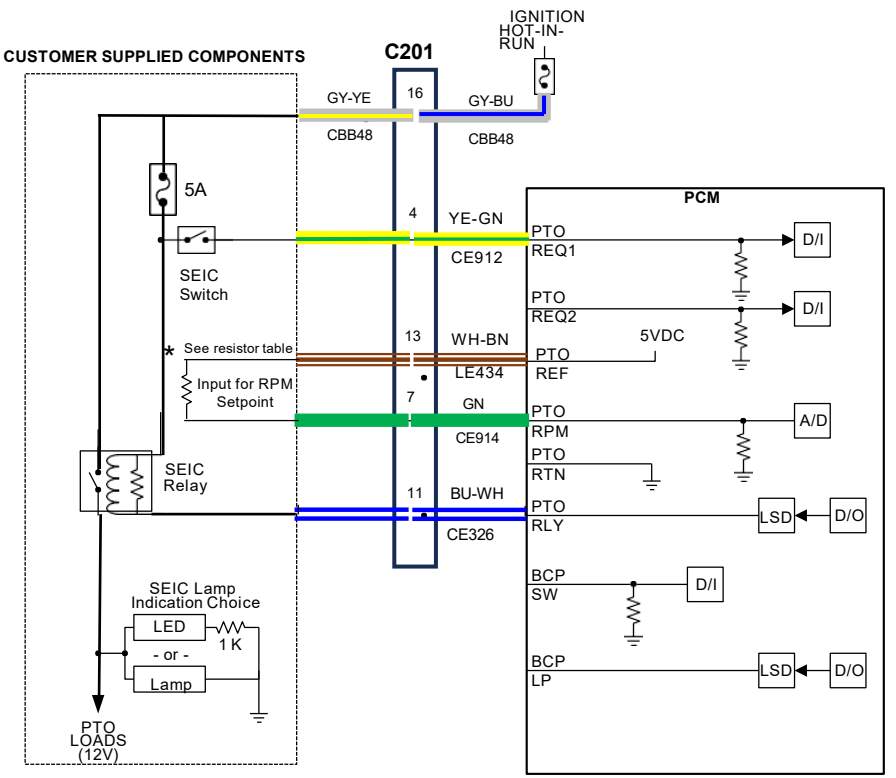
7.3L GAS

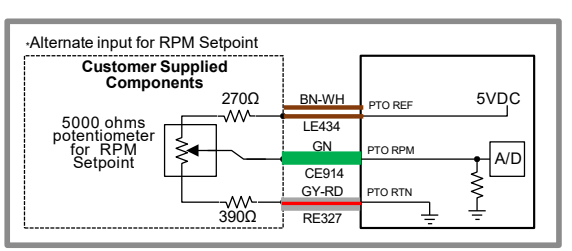


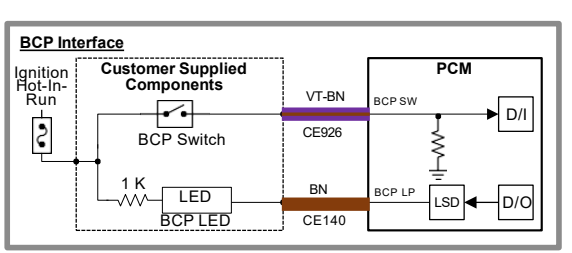




6.7L DIESEL



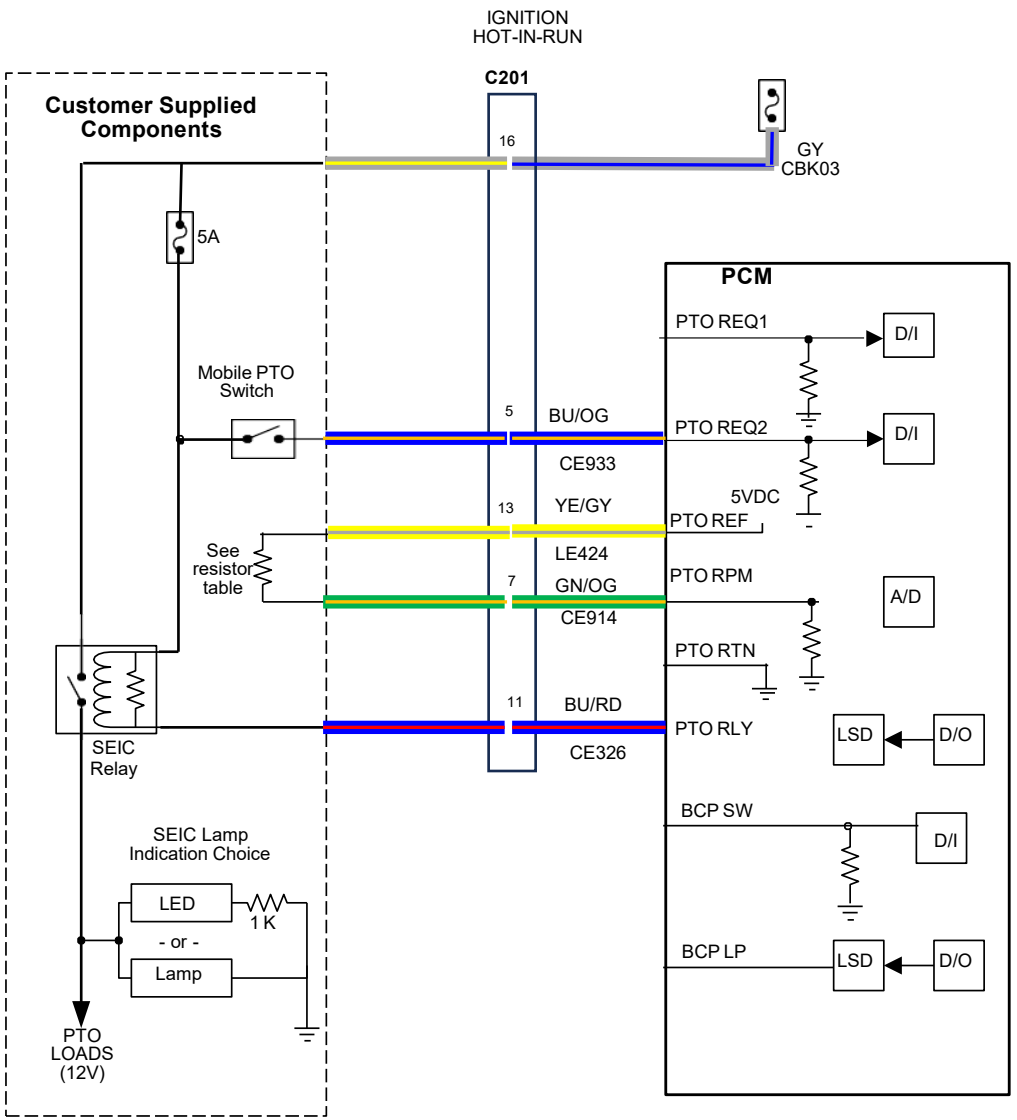




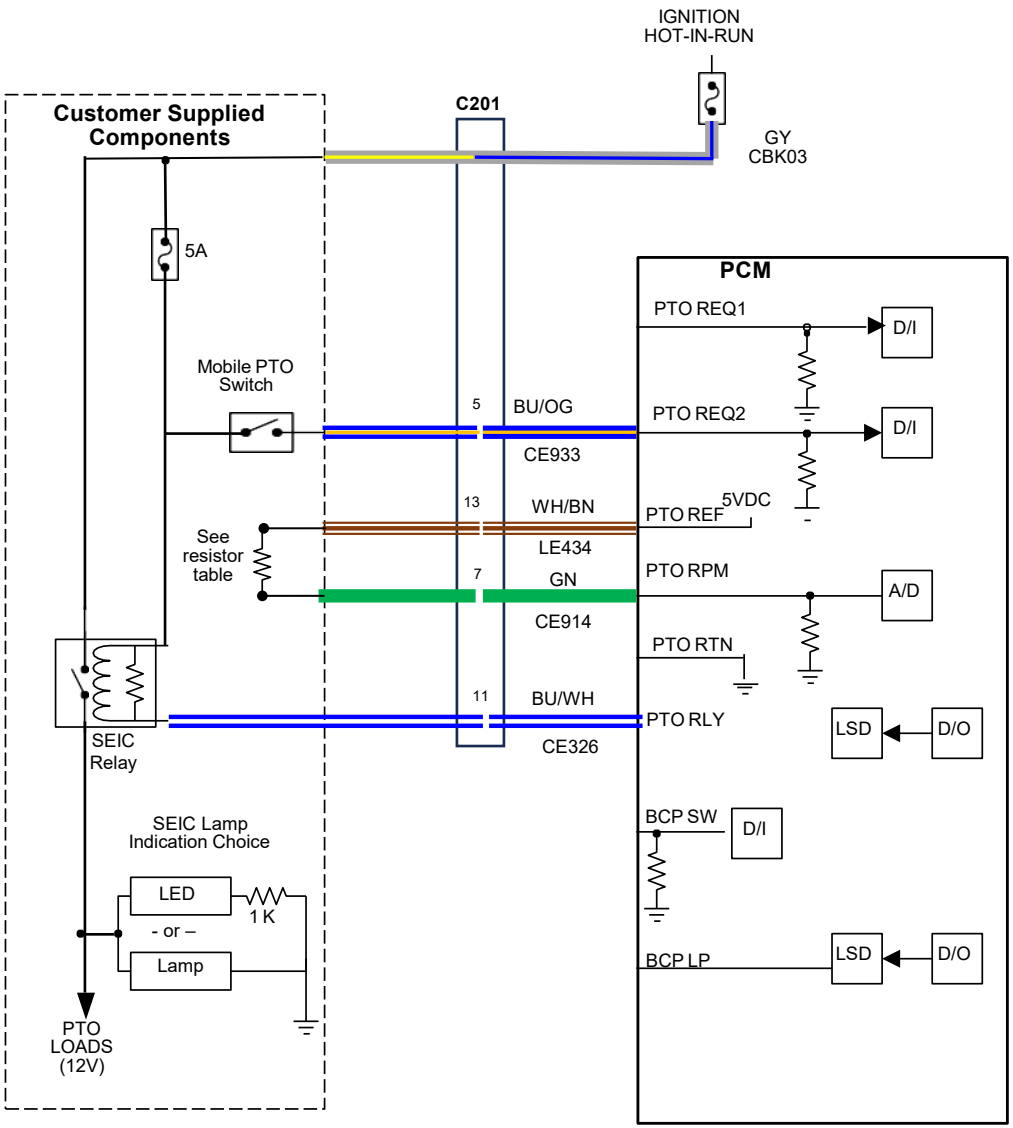
MEDIUM DUTY F-650/750

SEIC /PTO: SEIC & BCP MOBILE MODE SCHEMATICS (GAS & DIESEL)

7.3L GAS



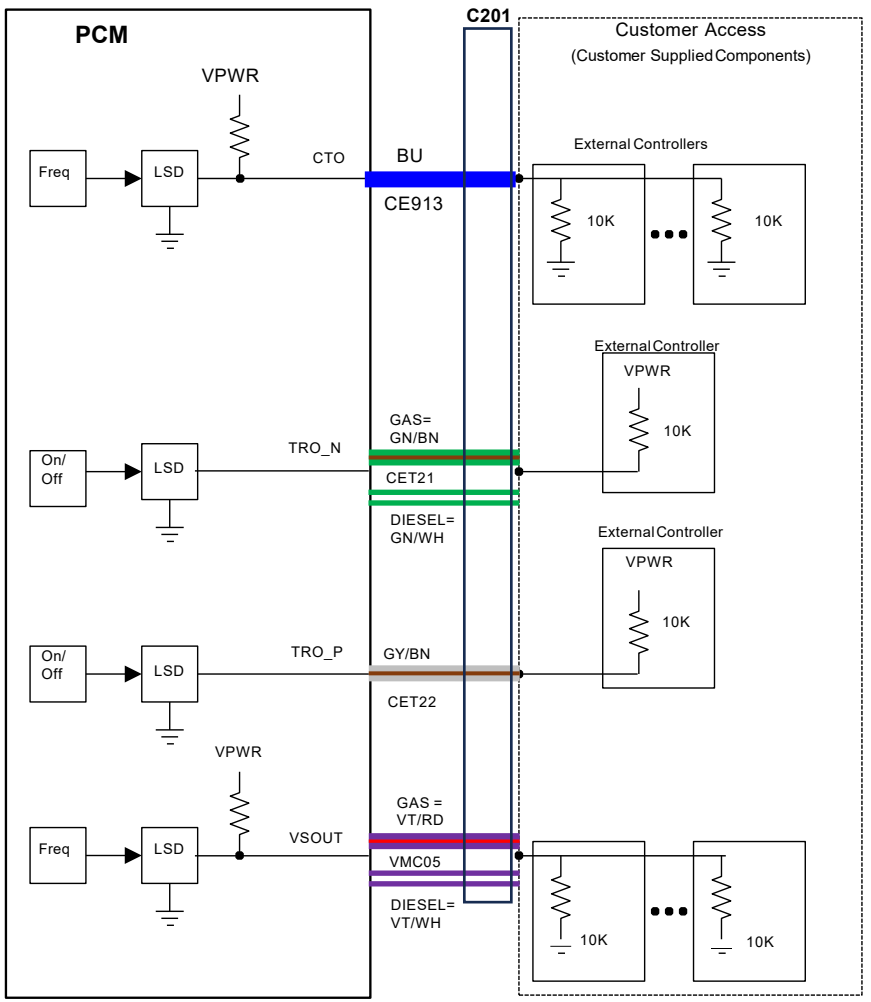
6.7L DIESEL



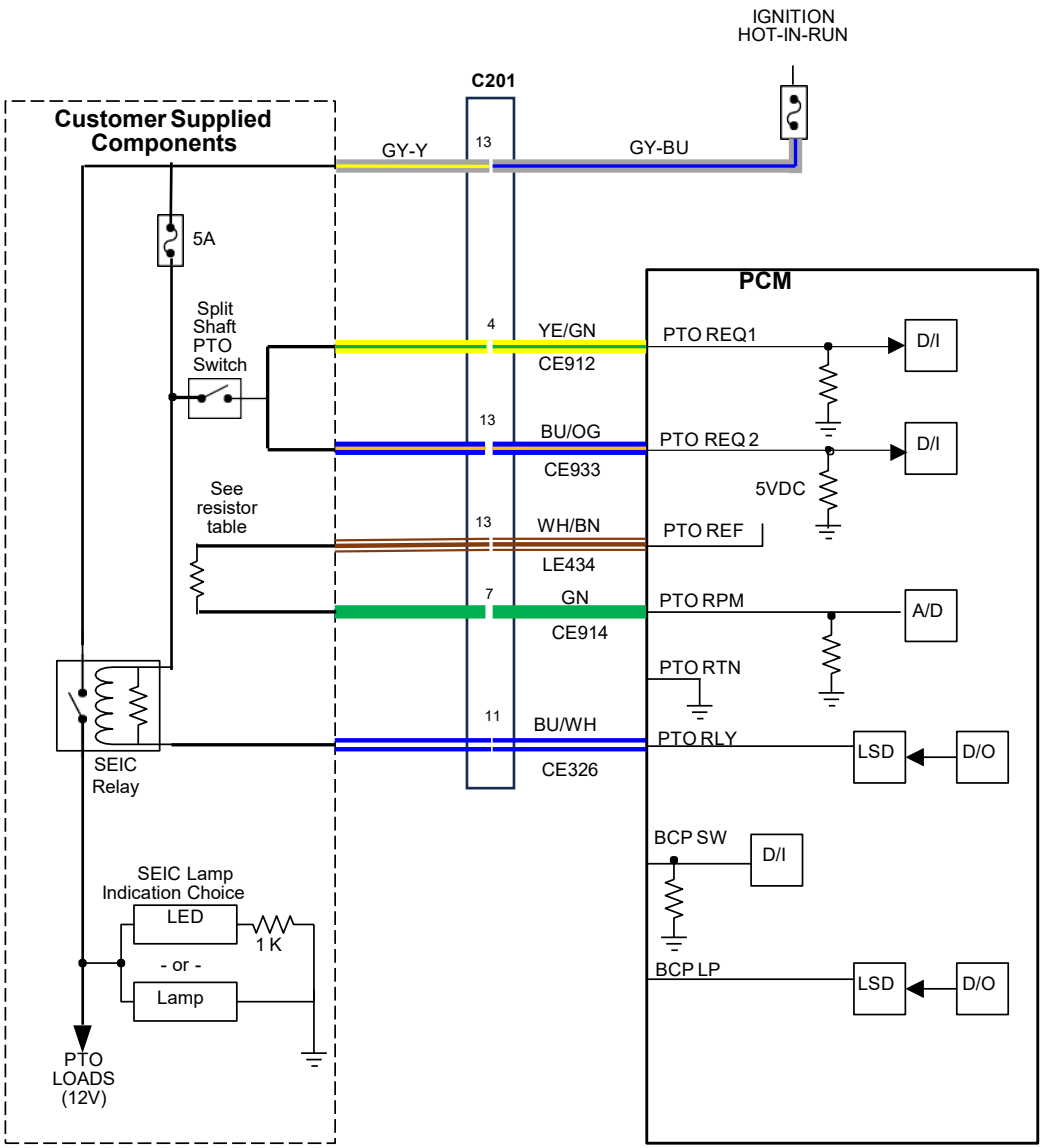
MEDIUM DUTY F-650/750

SEIC /PTO: CUSTOMER ACCESS & SPLIT-SHAFT MODE SCHEMATICS (GAS & DIESEL)

CUSTOMER ACCESS
7.3L GAS & 6.7L DIESEL

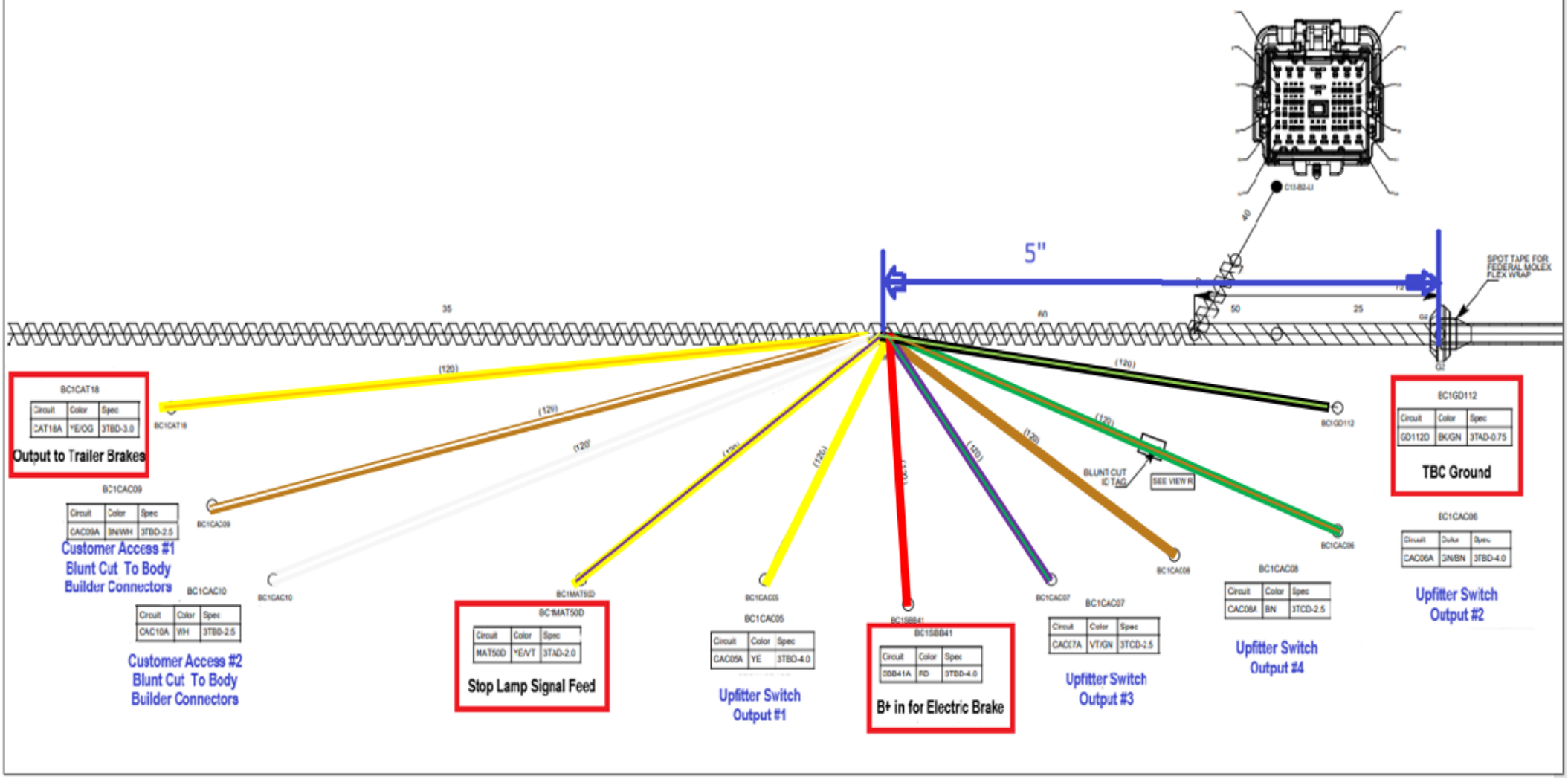


SEIC SPLIT-SHAFT
6.7L DIESEL

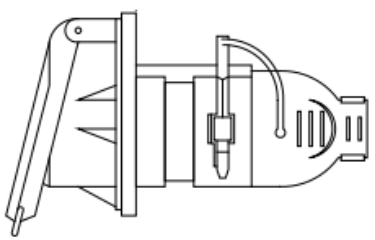


F-650 / F-750 Trailer brake and Upfitter Switch Output

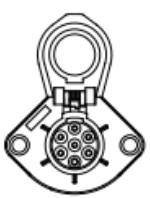
Blunt cut circuits are located on the driver's kick panel approx. 5" from the grommet.

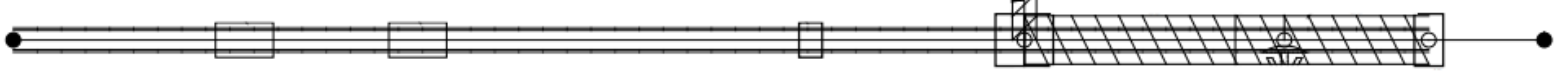


7-WAY TRAILER PLUG HARNESS



Cavity	Circuit	Color	DESCRIPTION
1	RAT08	WH	GROUND
2	CAT11U	BK	PARK LAMPS
3	CAT06	YE	LEFT TURN SIGNAL
4	MAT50	RD	STOP LAMP
5	CAT09	GN	RIGHT TURN SIGNAL
6	CAT11	BN	PARK LAMPS
7	CAT14	BU	BATTERY





Service Part # PC4Z-13A576-A (Engineering # PC4T-13A576-AB)

Body Builders Layout Book

MEDIUM DUTY F-650/750

CHANGE CONTROL